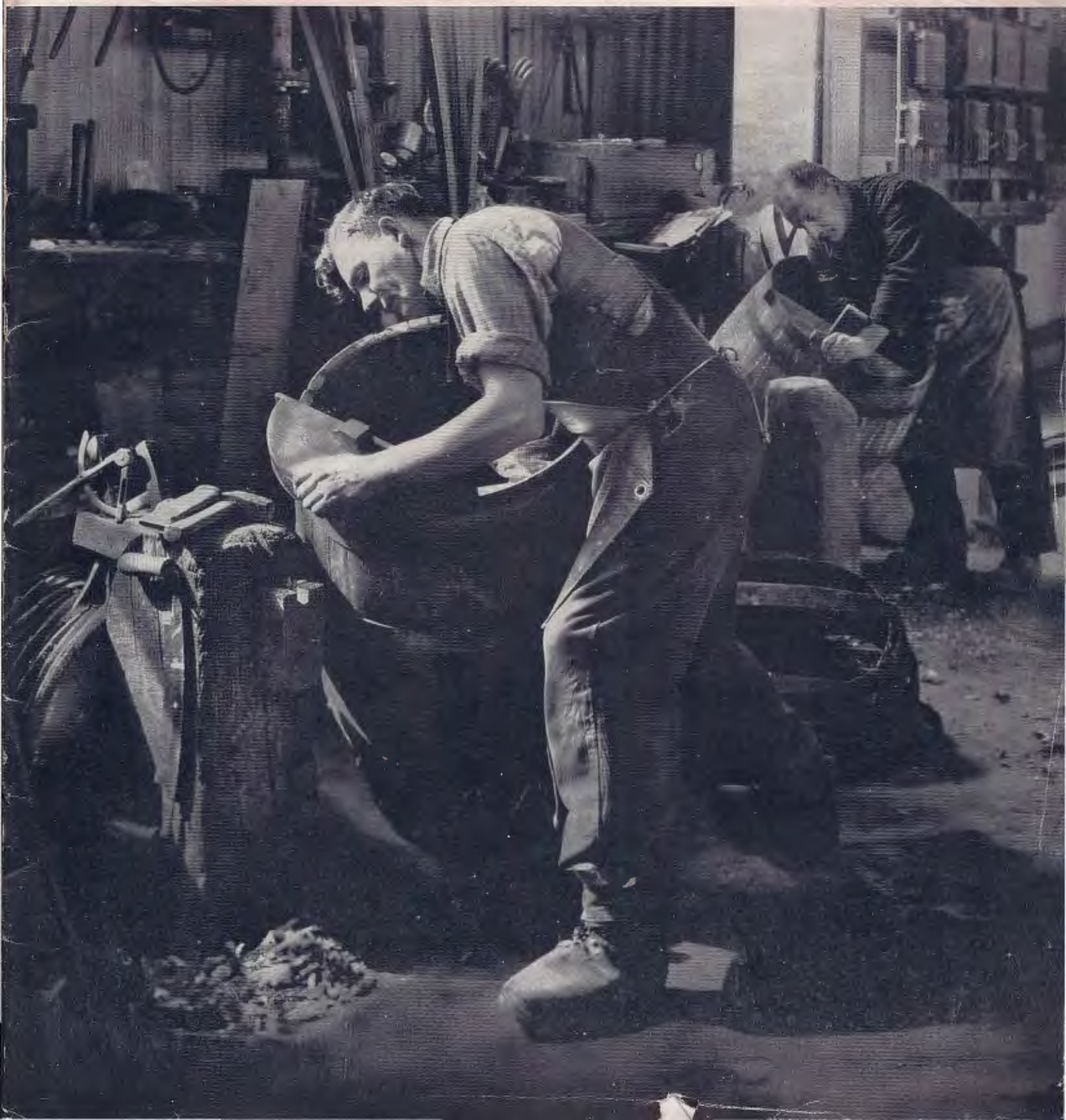




MAGAZINE

PRICE TWOPENCE

NOVEMBER 1951



THE I.C.I. MAGAZINE

VOLUME 29 NUMBER 181 NOVEMBER 1951

The *I.C.I. Magazine* is published for the interest of all who work in I.C.I., and its contents are contributed largely by people in I.C.I. It is edited by Richard Keane and printed at The Kynoch Press, Birmingham, and is published every month by Imperial Chemical Industries Limited, 26 Dover Street, London, W.1. Telephone: REGent 5067-8. The editor is glad to consider articles for publication, and payment will be made for those accepted.

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Front Cover: A study of craftsmanship—a cooper reching a cask at Huddersfield Works.

OUR CONTRIBUTORS

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SCIENCE CARE O

I.C.I. Pioneers' Research in

Near the village of Fordingbridge in Hampshire a team of workers is studying the habits of the part Here the scientist joins hands with the gamekeeper ledge of how game birds live and multiply has

MOST countries in Europe are devoting a great deal of attention to research on game birds with the objective of improving, or at least preventing, the decline of game populations. In America each state has its own conservation and research department devoted to the welfare of game and wildlife as a public amenity, the whole being co-ordinated by the U.S. Fish and Wildlife Service. In Britain the only serious research on this subject is being carried out by I.C.I. Game Services at the research station at Fordingbridge in Hampshire.

This establishment, run by the Metals Division, has simple but effective pathological and biological laboratories, linked with an area of normal farmland where studies of the game bird population in relation to its environment are in progress. Farmers, foresters, gamekeepers and owners of land in all parts of the country are continually helping and co-operating in many aspects of this research.

The work at Fordingbridge falls broadly into two sections. First, the study of the environmental conditions most favourable to game birds in relation to good farming and forestry—the ecology of game populations. Secondly, research on the causes of mortality, such as disease, accidents, weather, farming practices and predators: in other words, a study of the factors which are continually operating in the British countryside, for or against game birds.

Accurate measurement is the basis for nearly all scientific research. For a study of the factors affecting game birds it is necessary to have a complete knowledge of how many birds are on a certain area at different seasons of the year, the rate at which they multiply and the causes which lead to their dying or moving away. A census of the partridges over several thousand acres of farmland is a very different matter from recording the farm stock or even making an estimate of the rabbit population, since, in common with other game birds, the partridge can sit unseen in the open fields.

This census work had never been carried out before with the accuracy required for scientific studies, and the development of suitable methods of counting has in itself proved a very interesting and difficult research project for the ecologists at Fordingbridge. Incidentally, the census of the experimental

AND THE F GAME

to the Habits of Game Birds

e on the banks of the river Avon an enthusiastic
ridge and the pheasant under natural conditions.
per and each learns from the other. Our know-
been immensely increased by these researches.

area in Hampshire, and of several other farms and estates
in different parts of the country, has brought out many
points of particular interest in game and wildlife conservation.
It shows how essential it is for protection to be given to some
of those species regarded as the most common birds of the
countryside fifty years ago, when little thought was given to
the many changing influences in land utilisation, farming and
forestry, which were, even then, gradually making life more
difficult for game and other birds.

It has been found, for instance, that a pair of partridges,
given the best possible environment and protection, manage
to raise only four or five young to maturity in an average year.
In a bad year, with unfavourable weather, the production rate
may be well below two young to a pair of old birds, in spite of
the fact that the average number of eggs laid by every hen
partridge is as high as fifteen. With no protection at all—a
condition existing in many parts of the country today—the
losses will be far greater, so it is obvious that the result of two
or three bad seasons may easily prove disastrous to the popula-
tion of a whole area. One has only to watch a brood of newly
hatched partridge chicks, delicate little balls of fluff weighing
less than half an ounce, to realise how vulnerable they are to
cold and storms, vermin and accidents, since they must feed
themselves from the time they are hatched, relying only on
the parent birds for warmth and general protection.

As well as exposing the heavy natural mortality which must
be expected every year among game birds the census work
has shown that a great deal of movement over considerable
distances takes place at certain times of the year. In the early
spring, when partridge coveys break up and pairing takes
place, there is on most areas a widespread movement of pairs
in search of suitable vacant territories for nesting and producing
their broods. A special study of this movement is being made
by catching a number of partridges and marking them with
bright dyes and tabs which can be used to identify individual
birds wherever they are seen during this period. As may well
be imagined, the staff of the Game Research Station have
been only too ready to enlist the aid of the Dyestuffs and
Plastics Divisions in such projects, so that it is not uncommon
in the neighbourhood of the research station to see a wild



EXAMINING GAME BIRDS for symptoms of disease are Dr. Phyllis Clapham, the pathologist, and Mr. T. H. Blank, the ecologist



A WILD PARTRIDGE being fitted with a plastic tab for identification. With this marking an individual partridge can be identified through a telescope from a hundred yards away, and thus movements of birds under natural conditions can be recorded.



TYPICAL HAMPSHIRE FARMLAND, *part of the estate on which the experimental work is conducted*

partridge proudly displaying a red tail and a brilliant plastic label on its back.

The rapid changes in farming practice over the last fifty years are certainly responsible for some of the depletion in our game stocks, and it is one of the tasks of the Game Research Station to find ways of assisting the survival of game without interfering with production from the farms, since in these days full production from the land is as vital as from the factory.

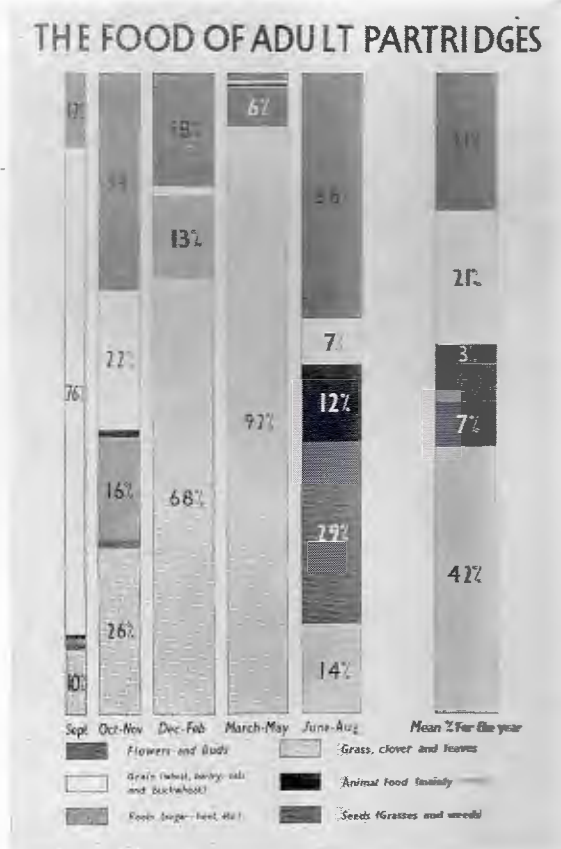
Last year on the experimental area, for example, 55 partridge nests out of a total of about 370 were destroyed by mowing machines in the hayfields. The high-speed mechanical cutters of today are very different from the horse-drawn mowers of our fathers' time, giving very little chance for the tractor driver to avoid killing birds and destroying nests in grass, lucerne and other crops. In order to minimise the heavy losses among birds through this cause experiments are being made with "flushing bars" attached to the tractor, with the object of disturbing the sitting bird before the cutter reaches her, thus making it possible to save the nest. At the same time trials are being made of special nesting sanctuaries where the cover is likely to be more attractive than in the hayfields, thus diverting the birds from nesting under such dangerous conditions.

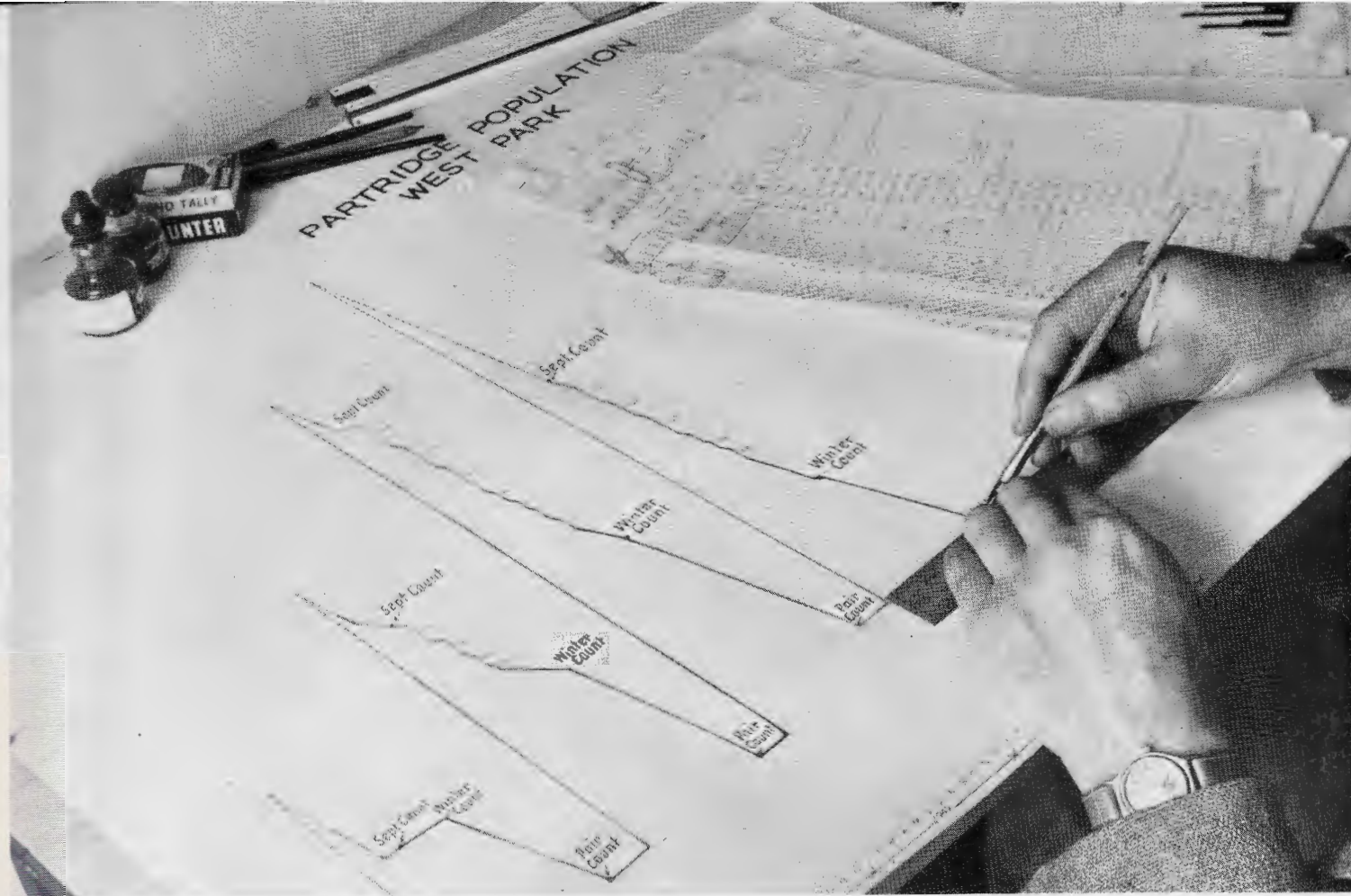
Another modern farming problem which is being studied is the effect of chemical weedkillers and insecticides upon wildlife on the farms. Some of these selective weedkillers of the hormone or

growth-regulating type have proved quite harmless to birds living in the sprayed crops, but others, using a nitro base, have been the cause of many deaths among game and other wild birds. In practice much can be done to avoid the use of the more dangerous of these chemicals, or at least to restrict their use to crops and weeds where there is reason to believe that the hormone types would not be successful.

No farmer will willingly use chemicals which he knows will destroy his bird life as well as his weeds, as evinced by the large number of requests for advice on this subject received at the Research Station. Chemical warfare on the farm has come to stay, but it is up to the farmer and the biologist—as well as the chemist—to make sure that the victims really are the farmer's enemies and that as little destruction as possible is wrought among his friends.

There is little doubt that game birds are, on the whole, the farmer's friends, as here too the biologists at Fordingbridge can produce the results of a scientific study of the foods actually eaten by wild game birds at different times of the year. The quantity of weed seed alone eaten by partridges makes one wonder whether the farmer would be better advised to keep more partridges rather than spend so much money on L.C.L. weedkillers! The wild pheasant, too, in reasonable numbers, more than compensates for the little grain he eats by the numbers of wireworms, leather-jackets and other noxious grubs devoured in the course of the year.





*Above: RECORDING THE POPULATION of partridges on the Research Station lands
Below: CATCHING PARTRIDGES at night for marking with identification tabs*





PROTECTED NESTING AREAS are sometimes wired off. Here a gamekeeper examines a nest in one of these sanctuaries.

At first sight it seems strange to find the staff of Game Services using and advocating the use of Cymag (incidentally a Billingham product) for gassing rabbits. But again there is good evidence that the rabbit is just as much a pest to those interested in game and wildlife conservation as it is to the farmer and forester. Rabbits not only compete for food with other more desirable wildlife, but destroy and disturb the nesting cover which is so essential to all game birds. Indeed, practically all farm pests, especially rats, grey squirrels and carrion crows, are also the worst enemies of game, and improved methods of controlling their numbers take a high priority in the game research programme.

In the pathology laboratory it is startling to find how many diseases and parasites affect wild birds. The most common diseases seem to be those caused by parasitic worms: "gapes," for instance, which afflicts practically all species of game birds as well as rooks, jackdaws, starlings, etc., is very prevalent in certain areas and causes the death of many thousands of young birds every summer. It is a very unpleasant-looking red worm (living on blood) attached to the inside of the windpipe. Since the larval stage of this worm may rest for several years in invertebrates, such as earthworms, which are eaten by birds, control or prevention of "gapes" among wild birds is a very difficult matter indeed.

Another interesting but noxious parasite is a tiny threadworm in the blind gut of grouse and partridges, dignified by the title of *Trichostrongylus tenuis*, which crops up in epidemic proportions about every six or seven years for no very obvious reasons. It is also becoming increasingly clear, as research proceeds, that most of the diseases of farm poultry can readily be transmitted to game birds, so a close liaison is maintained between Fordingbridge and various poultry research institutions, to their mutual benefit.

In the search for cures and preventive measures I.C.I. Pharmaceuticals are also co-operating and have already been able to provide treatments, such as 'Phenothiazine,' 'Sulphamezathine' and 'Barintar,' which can to a limited extent be used on game birds. Further research will, however, be necessary to work out methods of applying these chemical treatments to birds under completely wild conditions. Not many of the problems being tackled at Fordingbridge can be solved in the laboratory alone, and this is just one example of the co-operation between laboratory staff and field workers which is an essential feature of this type of research.

Although the partridge, because it is the most common and yet the least understood of all our game birds, is being studied most thoroughly, this does not mean that pheasants, grouse and other birds are being neglected in this programme of research. Indeed, in this new science of animal ecology it is impossible to concentrate entirely on any one species, since there are so many, often unsuspected, interactions between the species of animals and plants in the whole community. For example, the nocturnal feeding habits of hedgehogs, the burrowing of moles, the weather during Ascot week, the building of council houses, the nesting of rooks and the price of Argentine beef may seem remote from the game population of a Hampshire farm, but any or all of these can and do have an important influence on the survival of partridges and pheasants. So far it has not been possible to give as much attention to field research on grouse, since all the moors are a long way from Fordingbridge and the limited staff of the Research Station seem to have more than enough on their programme to keep them busy for a very long time.



TO PREVENT NESTS BEING DESTROYED and young birds killed, I.C.I. are experimenting with an attachment to the mower which flushes the bird ahead of the cutting leaf.

Information Notes

AUSTRALIA—TODAY AND TOMORROW

Contributed by Dyestuffs Division

THERE can be no doubt that Australia today is on the threshold of very great industrial expansion. Under the impetus of the extremely favourable demand for Australian products such as wool and foodstuffs the economy is expanding rapidly, particularly in the field of secondary industries. It is felt by many Australians that the Commonwealth stands in the same position today as Canada did thirty or thirty-five years ago, and that the next ten years will show a tremendous development in the production not only of primary goods but the products of many secondary industries.

Evidence already exists, through the development of the textile industry, that many important companies overseas have faith in Australian economy, and in fact two well-known textile companies of American origin have recently established subsidiaries there. Further evidence is provided by the planned entrance into the market of Courtaulds, Tootal, Broadhurst Lee, and the Bradford Dyers' Association—as manufacturers and processors. In addition, producers of rubber goods—particularly tyres—are expanding. The demand for motor-car tyres in Australia will undoubtedly be pushed forward, mainly by the development of a local automobile manufacturing industry which has already reached some size and importance through the establishment of General Motors/Holden, whose locally produced Australian car is proving extremely popular.

In the production of raw materials and services the Government of Australia, assisted by private enterprise, is also developing as rapidly as possible the natural resources of the country. Large water power developments are in hand, particularly at Snowy River, and the mining of brown coal by the opencast method has reached considerable proportions. One opencast mine, at Yalloran, is possibly the largest opencast coal mine in the world, and the production of brown coal from this particular field is of material assistance to Australian industry.

Unfortunately the labour position in Australia is such that serious hindrance to the industrial development of the Commonwealth can be noticed, but here again the Government is giving help and guidance through its immigration scheme, which in 1950 brought in 200,000 new people. This, together with the natural increase of the population, will, it is hoped, in the reasonably near future relieve the serious shortage of labour which exists today in Australia.

Australian labour on the whole appears to be reasonably efficient, and it is the opinion of certain industrialists in the

Commonwealth that, given proper guidance, Australian labour will produce as much per man-hour as labour in other parts of the world. Unfortunately industrialists in Australia continue to be plagued by strikes, go-slow movements and industrial disputes. These disputes are allegedly the result of Communist activities, but there is considerable doubt whether the Communist influence is the true cause of industrial unrest in the Commonwealth. Many people believe that disputes of this type are more the result of past bad labour relations than anything else, and a firm Government hand, combined with better labour relations and an increase in the supply of workers, would probably, within the next few years, reduce unrest.

Naturally, with the prevailing price for Australian wool and food overseas, the farmers are extremely prosperous. The incomes of even small sheep farmers have risen enormously, even though the number of sheep which they are running on their stations has not risen in the last ten years. This is due solely to the price which wool commands in the world markets today. Nevertheless, although the sheep farmer would like to increase production and improve his land and buildings, he is not able to do so because of the many shortages which exist in the Commonwealth today.

Apart from the shortage of labour, which prevents an increase in the number of sheep on the station, the Australian farmer is not able to obtain wire to improve the fencing of his station, nor is he able to improve his buildings as he would like because of the lack of the necessary raw materials. On the other hand, the sheep farmer is paying off loans which he had to raise in the lean years and is thus, in part at least, securing his future. Any extra money which he may have and which he cannot spend on himself is being used to buy refrigerators, furniture, cars and many other things, and this in turn reduces the amount of consumer goods available to the population.

Thus the cost of living in Australia is rising and is causing serious concern, not only in Government circles but also to the man in the street. While the Government and the Opposition have pledged themselves to bring about reforms which will reduce the cost of living, so far no concrete steps have been taken. A measure of the wages in Australia can be obtained through the fact that the basic wage in Australia is now over £A.9 per week. This minimum wage is applicable to any adult male. At the other end of the scale, a good sheep-shearer can earn anything from £A.60 to £A.100 per week during the season.

to be bought since the war by the Ministry of Supply, so that I.C.I. has had very little control over the price it pays. This still continues, and I.C.I. with other users is being severely cut in supplies in 1951. An interesting point is that the price of copper, although 48% above pre-Korean war levels, has been held down by the American Government's price-freezing. "Free market" prices would have given a much higher index in mid-1951.

Coal and Coke. I.C.I. spends over £12 million per annum on coal and coke, and the price of coal is probably more important to us than that of any other single material. A change in the price of coal starts a whole chain of other price changes in the materials we buy and in the cost of delivering them to the factory.

Steel Sheets. I.C.I., as one of the biggest makers and users of drums in the country, is very much concerned with the price of steel sheets. In mid-1951 this price was lower in Britain than in any other country in the world. Recent changes

have probably brought it more into line with other European prices. It should perhaps be mentioned that the price of steel is in fact more important to I.C.I. than the price of sheets because of the big part steel plays in the price of new chemical plant.

It is hoped that these brief comments give some idea of the various different factors which affect our buying prices. Apart from the overriding problem of obtaining supplies, one of the tasks of Central Purchasing Department is to forecast just how these factors are going to influence the prices of individual materials in the future. For all materials the long-term trends must be considered, but for many materials it is a question of trying to know how prices will move in the immediate future. For some the movements may be month by month, for others possibly day by day. C.P.D.'s buyers each specialise in a certain field and thus, by experience, try to acquire the particular knowledge to be able to forecast what is most likely to happen. Sometimes they are right!

SIX MONTHS OF I.C.I. EXPORTS

Contributed by Overseas Department

RAPIDLY changing conditions for exports both last year and this year render comparison of the export figures for the first half of this year with last year more difficult than usual.

The f.o.b. value of I.C.I. exports in the first half of this year reached the record total of £26.7 million as compared with £22 million in the corresponding period of last year and £26.5 million in the second half of last year. By *value* this is an increase of 22.5% on the first half of last year and 0.6% on the second half. By *volume* it is estimated that the corresponding figures are an increase of 14.8% and a decrease of 6.1%. Compared with the average for the whole of 1950, the increase by *volume* is 3.3%.

In considering these figures it must be remembered that there was a recession in export demand during the first half of 1950, as some of the more important markets, notably India and Argentina, were restricting the issue of import licences, and the situation has now improved. In the second half of last year there was, moreover, a large increase in demand caused by the Korean war and the strikes in the American alkali works.

This year Divisions started with depleted, if not exhausted, stocks of goods for export, and they were further handicapped by increased home demands. In the earlier months there were shortages of fuel and other important raw materials; export was also severely hampered by the Liverpool and Manchester dock strikes.

It is therefore a matter for satisfaction that Divisions were able to maintain their exports at the high figure achieved.

Sulphate of ammonia exports were particularly affected by depleted stocks at the beginning of the year and the fuel and raw material shortages. Billingham exports were as a consequence reduced by £400,000 compared with the first half of 1950 and nearly £1 million compared with the second half of 1950. All other Divisions had increases on both halves of 1950 with the exception of Alkali Division, which had a small decrease on the very high export figure reached in the second half.

Alkali Division's increase of £1,445,100 over the first half of 1950 is the largest individual increase and accounted for one-quarter of the total increase. Other notable increases were leathercloth, for which exports were trebled, and pharmaceuticals and paints, for which exports were doubled.

Most prices were increased substantially in 1951, primarily to take account of increased raw material costs. There were also numerous increases in freight rates, which are now on average more than three times pre-war rates. As a sellers' market was well established, there was little resistance or objection to the increased prices.

The pattern of I.C.I. exports changed noticeably when compared with the second half of last year.

Shipments to the dollar area decreased by just under £900,000, although they were still £1.2 million up on the first half of 1950. The main reason for this was that abnormal alkali shipments were made to U.S.A. in the second half of 1950 because of the American alkali strike.

On the other hand, shipments to the countries in the European Payments Union increased by £700,000 (the increase on the first half of the year was £1 million). This increase was spread over the major E.P.U. countries, with Holland and Italy predominating.

To Australasia, more especially to New Zealand, shipments were reduced by £400,000, primarily because of shipping difficulties.

Competition has been encountered from the former units of the German combine I.G. Farben, and reports have been received that Continental producers are better placed for shipping than those in Britain. The turnaround of their ships is much quicker and the sailing dates are more reliable. It is also reported that to certain destinations there is a more frequent service and that shippers are able to give firm shipping dates, which we are unable to do. Any return of the buyers' market is therefore likely to find us at a disadvantage unless shipping conditions can be improved.

BHC VERSUS DDT : THE RIVAL INSECTICIDES

Contributed by General Chemicals Division

BHC and DDT are both wartime discoveries; but whereas BHC remained on the secret list, DDT forged ahead in a blaze of publicity. An I.C.I. expert here discusses the rival merits of these two insecticides.

IN 1825 Michael Faraday found that by mixing benzene and chlorine in the presence of sunlight a new substance was formed—benzene hexachloride. Apart from this discovery being recorded, very little work was done with this compound until well over a hundred years later. It just sat on the shelf as one of those dull, unreactive chemicals that did not “do” anything. During that time, however, it was established by several workers that benzene hexachloride existed in at least four forms (isomers), to which the names alpha, beta, gamma and delta were given.

In the spring of 1942 I.C.I. established that this substance killed insects, and in 1943 they made the important and unexpected discovery that this remarkable insecticidal property was almost entirely associated with only one of the four forms—the gamma isomer. At that time it was a very urgent matter to find a substitute for derris, which was used very largely to combat agricultural pests, particularly the turnip flea beetle, since supplies of derris were cut off by the Japanese occupation of Malaya and the East Indies. Benzene hexachloride, or, as it is often called, BHC, proved even more effective than derris in controlling turnip flea beetle, but its discovery was treated as a war secret by the Government.

It was not until 1945 that Dr. Slade, then Research Controller of I.C.I., was allowed to announce that against certain important insect species the gamma isomer of BHC was a more powerful contact insecticide than any other material so far examined. The name ‘Gammexane’ was then registered by I.C.I. as their trade mark and is used for insecticidal preparations produced from BHC of I.C.I. manufacture. It quickly caught the public ear, and even in scientific publications both at home and abroad there is a tendency to use “gammexane” as a general term for all BHC, whether manufactured by I.C.I. or not. This may be flattering, but it is an incorrect usage.

BHC had such properties as an insecticide that, but for war-time secrecy, it would have been publicly hailed by all entomo-

logists as revolutionary. It killed insects merely by contact or even at a distance by its vapour and it acted as a stomach poison. What is more, against some species like mosquito larvae it did all this when present even in infinitesimally small amounts.

The little wrigglers sometimes found in water which are the young stage of mosquitoes are killed by 1 part of gamma BHC in 100,000,000 parts of water! A quarter of an ounce in oil is sufficient to treat an acre of water surface and make a lake or swamp uninhabitable to mosquito larvae. Even insects like the grain weevil are killed by amazingly small amounts of gamma BHC when it is mixed with the grain on which they feed. To achieve this effect only 1 lb. is mixed with 500 tons of grain.

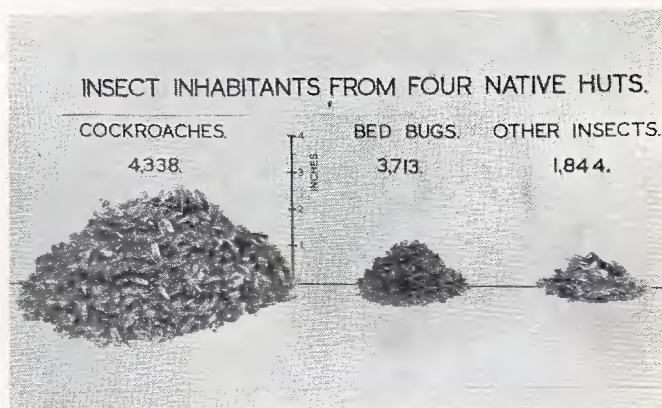
However, just before discovery of this powerful material another new insecticide had been discovered in Switzerland and rapidly became world-famous as a result of the spectacular effects it achieved when used by the allied armed forces for the control of disease-carrying insects. This substance, now known as DDT, has become a household word everywhere. The independent discovery of these two new insecticides within a short time of each other is another of those cases which have occurred before in history when outstanding advances have been made in the same field by investigators working along completely different lines and producing a similar end result. BHC and DDT were discovered quite independently about the same time, yet either one of them would have marked the beginning of a new era in insect control. So dramatic were the results achieved by DDT when compared with the older insecticides that it rapidly became world-famous and enjoyed tremendous publicity during the closing stages of a victorious global war.

BHC was still a military secret. When it was eventually announced, the thunder had been stolen by DDT and few people believed that an even more powerful insecticide had appeared.

It has taken four years to convince the entomologists and other technical authorities throughout the world that gamma BHC is indeed a more powerful insecticide than DDT and that it kills many species of insects and other unrelated organisms



Spraying a native hut with ‘Gammexane’



The aftermath of chemical action

that are quite immune to DDT. This has been no easy task for the I.C.I. Technical Service Section concerned and necessitated visits to many parts of the world where, in a host of different tongues, the authorities were forced to pay attention to the dramatic results achieved by BHC and were prevailed upon to carry out trials for themselves. At present a world demand for many thousands of tons cannot be satisfied, and all as a direct result of the work and initiative of I.C.I. following the discovery in England of gamma BHC.

What is it that has made the present position possible in spite of the fact that the crude formulations of BHC suffered from the handicap of a musty and clinging odour? The feat of making a DDT-enthralled world listen to the 'Gammexane' story was only achieved through the earnestness of the conviction that in BHC existed a more powerful weapon than even DDT appeared to be.

No one will decry the splendid achievements of DDT, but it soon became evident that it was not the universal entomological panacea that world-wide publicity had first tended to make it appear. BHC makes no claim in that direction either, but it has been proved that many of the pests that could not be controlled before can now be exterminated by BHC. The group of ticks and mites is a case in point, not to mention many insects in various fields, of which perhaps the most striking is the large bug which transmits Chagas disease in South America. This bug is immune to even high concentrations of DDT, but one application of BHC in a village in Uruguay completely wiped out this most gruesome insect.

New prospects in the control of insect-borne disease have opened up. Formerly the only hope of controlling Chagas disease was to burn down the bug-infested houses. Now there is no excuse for the disease existing at all, for BHC can wipe it out by destroying the carrier. A more homely example is the ubiquitous cockroach, on which DDT has little effect but which is completely susceptible to BHC.

Many other cases could be cited, but perhaps the most important of all concerns the strange reactions of the worst carrier of malaria in Africa. More and more evidence is accumulating to show that this mosquito is repelled by DDT before it has time to absorb a lethal dose and may live to transmit the disease. On the other hand, BHC kills more rapidly and the mosquito does not escape. This, and other important considerations, have led the World Health Organisation to recommend that in Africa large-scale anti-mosquito campaigns should be begun immediately, and the insecticide of choice is BHC.

One of the most serious criticisms of BHC has been its lower persistent effect when compared to DDT. Even this supposed defect is now in question, and the persistence is sufficiently prolonged to make BHC generally more economic than DDT.

These observations have been made from the point of view of the insect control problems in which General Chemicals Division is directly interested, and a similar picture could be drawn by those responsible for other fields of application.

One of the most important qualities an insecticide must have, if it is going to be used widely, is safety. Neither man nor his beasts nor his crops must be harmed by its application. At one period an uninformed reaction developed against DDT on this important question. A great deal of work, however, has shown that under normal circumstances of application DDT is safe; but how much better it is for those nervous souls to know that gamma BHC is even safer. The highest medical authority in Britain has ruled, after extensive trials, that gamma BHC is so safe that it may even be added to foodstuffs at a rate which is well above that normally recommended for the control of the insects concerned.

It is this factor of safety, as well as its other outstanding qualities, that makes gamma BHC still the most remarkable all-round insecticide that has yet been produced.

THE LATE G.W.R.

Mr. Henry Maxwell, who shares with many members of the Company an enthusiastic interest in railways, here contributes a review of Mr. O. S. Nock's book The Great Western Railway—An Appreciation, published by W. Heffer & Sons Ltd., Cambridge, price 18s.

THE Bill for the nationalisation of British railways had just been launched in the House of Commons when the well-known Cambridge firm of Heffer invited Mr. O. S. Nock to write an appreciation of the Great Western Railway, so soon to disappear. No more opportune gesture and no wiser choice of author could have been made. Mr. Nock, as many readers of the *Magazine* are aware, not only brings to his subjects a massive technical knowledge and authority but a most sensitive appreciation of atmosphere and scenery, and an enthusiasm as discriminating as it is varied.

Who else but Mr. Nock, for example, would regard the footplate of a fast-travelling express engine as a particularly fortuitous vantage-point for watching the finer strokes of cricket? Who else, again, but Mr. Nock, in recording the logs of his footplate journeys would find time to exult and revel in the scents and shades of the flowers and ferns which crowd the lineside, and whose changing aspects give to the enlightened traveller a feeling, as Mr. Nock justly notes, of having found "the epitome of England"?

The book is not for the technical but for the general reader, that is to say, for anyone for whom railways are something

more than a mere means of transport. In the space of a review it is not possible to do justice to its richness of historical interest, contemporary information, its sensitive description and observation, its originality and its charm. Above all, it is a real appreciation. Mr. Nock shows both how and why the Great Western Railway came to be the national institution which it undoubtedly was. In part owing to the unobscurable genius of Brunel, in part owing to the glamour of the broad gauge, in part to the glory of the West itself, in no small measure to the supremacy, over so many years, of Swindon as a centre of locomotive engineering, the Great Western tradition took root and burgeoned.

To many thousands of Englishmen the initials G.W.R. were as much a part of their birthright as was the red earth of Devon. The very engine names of the old G.W. were an unconscious epitome of England, the *Counties*, *Courts*, *Manors*, *Flowers* and *Bulldogs*, the *Castles* and the *Kings*. If it be true that an Englishman's home is less his castle today than of yore, it is certain that to an entire generation of Englishmen all over the globe a *Castle* means home. Mr. Nock in this delightful valediction to the Great Western, shows why.



The hands of a craftsman

THE COOPER

Craftsmen who follow old traditions are still employed to a great extent in modern industry. This article tells how exponents of one of our most ancient crafts keep the largest dyestuffs factory in the British Commonwealth supplied with the casks that take its products all over the world.

COOPERAGE, the trade of making casks from staves and hoops, is of great antiquity. It is in Latin literature that the earliest references to the craft occur, and the word "cooper" itself is derived from the Latin word *cuparius*. Pliny ascribes its invention to the inhabitants of the Alpine valleys.

The craft is one that has changed little throughout the centuries, and the cooper is one of the most conservative of craftsmen. The tools used in a modern cooper's shop have still an almost medieval flavour. The chive for trimming staves level, the croze for groove cutting, the adze for chiming or

smoothing casks, and the chinze or caulking iron—these are still part of the cooper's tool kit. You will find but one modern invention in most coopers' shops. The cooper of today uses a circular saw to cut the round heads of casks and chamfer or bevel the edges symmetrically. This, a lengthy operation by old-fashioned methods, can be done with the circular saw in a few minutes.

There are several subdivisions of the industry, each one requiring specially trained coopers. The "wet" cooper makes casks for holding liquids. He is the most skilled of all, as his casks have to be perfectly tight when filled, bear the strain of

transportation—often to great distances—and resist considerable internal pressure when filled with fermenting liquids. The “dry” cooper makes slack casks for holding dry goods. The “white” cooper constructs wooden tubs, buckets, churns and other even-staved vessels in which the sides are straight and not curved as in casks.

Elaborate modern cask-making machinery has now largely superseded hand labour, as making casks by hand is a slow process. But the skilled cooper still makes a good living repairing and reconditioning the millions of casks required daily to carry the products of modern industry. Tight barrels are used to hold wines and spirits, beer and cider, oil and liquid chemicals; and slack barrels are used for packing cement, alkali, fruit, fish and numerous other products.

Casks in England are, generally speaking, now made only by breweries, either by hand or by machine; and the life of brewers’ casks is so long that renewals are infrequent. There are coopers’ shops in a number of I.C.I. Divisions, but our coopers are employed to repair casks, not to make them. A cask made in this country might cost from £15 to £20. So mass-produced American casks, which originally held whisky or lard, are bought for much less than this. They are then reconditioned and tested in the coopers’ shop before being filled with I.C.I. products and sent on their travels again.

The largest coopers’ shop in I.C.I. and—outside the great breweries—one of the largest in the country is at the Huddersfield works of Dyestuffs Division. Here thirty-four coopers are employed. They turn out each week about three thousand reconditioned casks of six to forty gallons capacity, or more than 150,000 per year.

American lard or whisky casks are normally used for dyestuffs. When these casks arrive at the Huddersfield coopers’ shop they are classified according to their grade and condition and then put through a washing machine. After being washed they go into giant drying stoves holding more than a hundred and fifty casks. When the coopers arrive at work each morning their first job is to take the casks out of the stoves and sort them into rows. These rows are numbered. The men then draw lots by drawing numbered bungs out of a sack for the row which is to be the man’s daily task. The coopers are employed on piecework and average about twenty-one casks a day.

Casks arrive at the cooperage in varying conditions of repair. Some are badly damaged, needing new staves or new heads; but the skilled cooper can repair the same cask again and again, until finally little remains of the original material. Fitting a new stave is a simple matter for the experienced craftsman. To the layman, the cooper, when dismantling a cask, seems to do a simple juggling trick with the iron hoops and having fitted a new stave puts the cask together again with equal ease.

To test the finished cask, a quantity of boiling water is poured into the bung hole, which is then sealed up with a long plug. The cask is then rolled about for a few minutes. If when the plug is slightly loosened it flies out of its hole the cask is leakproof. Each finished cask is inspected by the chargehand to see that it is clean and properly repaired.

The thirty-four coopers work under the supervision of Mr. George McNeill, the foreman, who has 30 years’ service at Huddersfield Works. George, who was born in Millhouse, Kyles of Bute, Argyllshire, came to Huddersfield in 1919 after serving throughout the first world war with the Argyll and Sutherland Highlanders. He has twice broken his I.C.I.



Steve Adamson prepares a new stave



James Adamson riveting a hoop



Stan Adamson fitting a new stave to a cask



Arthur Wodard compassing a barrel top for size of a new head

service for short periods, but has now been foreman for ten years and was a chargehand before that. His first job as an apprentice was with Curtis and Harvey Ltd. in a small gunpowder factory, which was (after he left it) later absorbed into what is now Nobel Division. His elder brother is also a cooper at Drummonds of Greenock. George is a craftsman of the old school, who takes great pride in his work. He is a kindly boss, but he demands a high standard of workmanship from his team.

The highly skilled craft of cooperage is often handed down from father to son, and many coopers' shops have employed four and five genera-

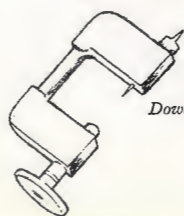


Walter Archer "rushing" a cask

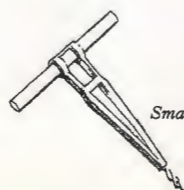
tions of the same family. Three families of brothers work at the Huddersfield Works cooperage.

The Adamson brothers—Steven, Stanley and Jim—all came to Huddersfield from Hull during 1950. In Hull they worked on the fish dock, where a fourth brother is still employed. Their father and grandfather were coopers, and although family history does not relate what their great-grandfather did, very possibly he was a cooper too.

Gordon Morson joined I.C.I. in 1940. His brother Frank, after serving as a sergeant during the war in an anti-aircraft unit, joined him in 1947. They came from Selby, where they



Dovelling brace



Small rimer



Figger



Frank Morson bevelling a head on the circular saw



Gordon Morson finishing a cask head by hand

served their apprenticeship and became coopers employed in preparing casks for margarine oil. When this coopering job became redundant, due to the changeover from casks to glass-lined tank cars for carrying the oil, they did not wish to lose their trade, and came to Huddersfield Works. Frank, the younger brother, is a shop steward.

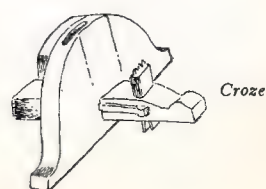
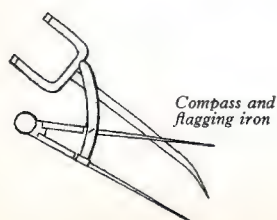
The third set of brothers are the Wodards. Arthur is eight years older than Albert, but they have a parallel career with eight years' difference. Arthur was apprenticed in 1919 as a cooper at Selby with Hartley's Cooperage and Albert with the same firm eight years later. Then, like the Morson brothers,



John Snowball operating the cask washer

the disusage of casks in favour of road cars forced them to move, which they did after the war. Arthur came to Huddersfield in September 1946 and Albert in March 1947. Their elder brother is still a cooper at Selby.

Casks from the Huddersfield cooperage go to different sheds to be filled with varied products and may later be seen in the despatch department bearing labels addressed to I.C.I. customers in places as far distant as Buenos Aires and Singapore. Thus do the modern followers of one of the most ancient of crafts play a part in the safe packing and carriage of some of our most important exports.



IN SEARCH OF SOUP

By Henry Sarson

Man has been well described as a cooking animal. But it was not until the eighteenth century that he began making the soups we know today, as distinct from a mess of pottage or stew. This development was bound up with the introduction from Italy of the fork and of earthenware plates to replace the simple wooden trencher.

The Mock Turtle sighed deeply and began, in a voice choked with sobs, to sing:

*Beautiful soup, so rich and green,
Waiting in a hot tureen.
Who for such dainties would not stoop?
Soup of the evening, beautiful soup.
Beautiful soo-op.
Beau-ootiful soo-op.
Soo-op of the evening,
Beautiful, beautiful soo-op!*

ALICE IN WONDERLAND can provide a suitable quotation for most subjects, but some three hundred and twenty-five years before the Oxford mathematician Dodgson writing as Lewis Carroll gave us the above, another great Englishman Andrew Boorde, our first real nutritionist, had this to say about soup:

Potage is not so moch used in al Chrystendom as it is used in Englande. Potage is made of the lyquor in which flysshe is soden in, with puttyng-to of chopped herbes, otemele and salt. The herbs with which the Potage is made withal, yf they be pure, good and clene, not worm eaten, nor infected with corrupte ayre descendynge upon them doth comfort many men, the ventosyte notwithstanding.

That is from the *Dyetary of Helth*, written in 1542, and it brings us at once to the first point in the history of soup.

When we begin to delve into this problem, the first snag we meet is that the word "soup," meaning what it means today, did not come into our language until the middle of the seventeenth century—somewhere about 1653. Before that, what we call soup had been known as pottage, brewis, broth, gruel and by many other names, most of which have now fallen out of use. Yet man has well been described as a cooking animal, and it seems obvious, from the archaeological remains of his early cooking vessels, that many of his early efforts at cooked food must have been, in Boorde's words, "the lyquor in which flysshe is soden in."

How, then, did pottage become soup, a separate dish, and not just the gravy from a stew? To understand this we have to go back some five hundred years to our medieval ancestors.

In one of the earliest cookery books, *The Form of Cury*, written by the Master Cooks of King Richard II, about 1390, the dedication says:

First it techeth a man for to make commune pottages and commune meetis for the household, as they shold be made, craftly and holsomly.

These "pottages" were founded on a stock made by stewing the bones and sinews of beef, veal and mutton, and especially marrow-bones, what we call shin of beef, with herbs and vegetables such as they had, and in this stock they cooked the joint, game or fowl and flavoured it with spices. They were very fond of cinnamon and saffron (Saffron Walden, Essex, produced masses of this crocus for flavouring and colouring), and they even made a cinnamon pottage, which must have been so highly flavoured as to be quite unattractive to our modern tastes. The pottages were thickened with crumbled bread and are the ancestors of modern soup. How were they eaten?

This is an important question, because all our ancestors had in the way of table utensils was a trencher or plate, as we should call it, made of wood or pewter, or silver for the aristocracy, a spoon and a knife. The fork had not yet arrived.

The pottage was ladled on to the trencher, into which you had put a slice of bread. These pieces of bread were called



This attractive decorated title page of Hannah Woolley's The Queene-like Closet, printed in 1684, shows typical scenes in the contemporary kitchen

"soppes," and were used to sop up the gravy. You ate all this with your spoon, and in the *Boke of Curtesy*, written about 1460, we are instructed to eat our pottage first with bread. But it was not yet a separate course, for to it were added slices of meat off the joint or bird, which you ate with your fingers. That is one reason why Wynkyn de Worde's *Boke of Kervynge*, written about 1508, was so popular. The art of carving is important when one has to eat the result held in the fingers. So meat was eaten on the same plate as the pottage and bread, very much like the Yorkshire custom of having the batter pudding first, cooked under the joint and full of gravy, and the joint itself carved later.

Their Majesties King Henry VIII and Queen Elizabeth pulled their capon or wild duck to pieces with their fingers, which they dipped in rose-water afterwards and wiped on a brodered napkin. We still follow this practice when eating fruit.

And then something happened to change these habits. A rather eccentric traveller named Tom Coryat, returning from a tour of Italy, brought back the table fork, somewhere about 1620. This is what he says of it.

I observed a custom in all those Italian cities and towns through which I passed, that is not used in any other country that I saw in my travels. The Italians do always at their meals use a little fork with which they cut up their meat. This form of feeding is generally used in all places in Italy, their forks for the most part being made of iron, steel or silver, though those are used only by gentlemen . . .

So the table fork was introduced into England, though it took well over a hundred years for the new custom to become well established.

In three famous cookery books of the seventeenth century—Gervais Markham's *The English Hoswife*, Kenelm Digby's *Closet Opened* and Hannah Woolley's *Queene-like Closet*—soup as such is not mentioned. It is still pottage, broth, brewis and gruel, and it is not until the beginning of the eighteenth century that we find the first mention of "soop."

In the frontispiece of Hannah Woolley's *Queene-like Closet*, the 1684 edition, the cook in the top left-hand panel seems to be pouring wine into a broth, and again in the bottom left panel two obvious stock-pots are being stirred over the fire. Yet she does not mention soup, though she gives many recipes for such things as barley broth with meat, gravy broth, cabbage pottage and others. (The word pottage is sometimes spelt with one t and sometimes with two.)

The same applies to Markham's and Digby's books—broths and pottages in number, but no soups. When we jump fifty years to 1725, however, about the time the fork was becoming general, we find that a Mr. R. Smith, publishing *The Compleat English Cook*, puts soup very much on the map.

Compleat English Cook.

S O O P S.

Good Herb Soop for the Spring.



TAKE twelve Cabbage-Lettuces, six Green Cucumbers; pare them, and cut out the Cores; then cut them in little Bits, and scald them in boiling Water, and put them into strong Broth; let them boil till very tender, with a Handful of Green Pease. The Pullet or Duckling you intend to put in your Soop, you may boil with your Herbs; scum the Fat off, and boil your Bread in the same Broth; use no Thickening to this Soop.

B

To

He had been "cook to King William the Third, to the Dukes of Buckingham and Ormond, to the French Ambassador and others of the Nobility and Gentry." That is his own description of himself.

He begins his book with soup, which he spells "soop," as though it was something rather new and important, and gives us half a dozen recipes. But these, as the illustrations show, are still apt to be muddled up with pottage. A chicken or duckling is added, and it is thickened with bread.

His "Good Herb Soop for the Spring" is really a pottage with the chicken or duckling added to what we should call a vegetable soup. In Sallery Soop (how much better than celery is that English word "sallery"!) we are given a choice of colour, but still the pullet is added in the middle with bread soppes, and it is really a pottage. But his Onion Soop might well be a modern dish, though there would be some difficulty in getting the yolks of eight eggs. The pottage idea has gone and we now have true soup, with wine added—an important constituent of a good soup. It is interesting to note that the "soppes," the pieces of bread, are cut into dice and fried, a practice we still occasionally carry on today and a relic of the original "soppes."

By the beginning of the eighteenth century soup as a separate

course had arrived, and though Mr. Smith only gives us six recipes, in 1760 the famous Hannah Glasse gave over twenty, though she still spelt it s - o - o - p. In 1810 Mrs. Rundle's *Domestic Cookery* had brought the number up to thirty. The change in the spelling to s - o - u - p would seem to have been due to the influence of French cooking, which played such a part among the élite during the eighteenth century and so riled Hannah Glasse. By 1870 Gouffe, in his *Royal Cookery*, had managed to discover seventy different soups.

What had caused this extraordinary development in barely two hundred years? Apart from the introduction of the fork, which enabled one to eat meat more easily, earthenware and china had become available to everyone. You no longer had to select what you wanted from a variety of cooked meats put always on to the same trencher. Plates were changed for the different courses and our meals became more divided—soup, meat and sweets.

There are two further historical facts that had a great influence in popularising soup. In 1498 Christopher Columbus discovered America, and three things that followed had a great influence on soup. They were the introduction of maize from Mexico, and now widely used as a thickener in soups; of the potato from Peru, also used as a thickener as well as making a very good soup itself; and lastly of the tomato, another native of Peru, the basis today of the most popular soup of all, as well as the foundation of many sauces.

Another relevant historical event was the formation of the John Company, the old East India Company, for it is to its influence and the opening up of the East Indies to trade that we owe those soups that are hot and highly flavoured, like mulligatawny and others in which curry powder plays a part. India also gave us the turtle. We began with a quotation about turtle soup; and because the custom is to serve it at the Lord Mayor's Banquet one is apt to associate it with aged tradition. This is entirely wrong, for turtle soup is a comparative newcomer. Originally the turtle, which came into vogue about the end of the seventeenth century, was stewed, baked or jugged like a hare and served with forcemeat balls and redcurrent jelly. To make soup from it was a secondary matter, to use up the left-over bits; personally I think the rum punch served with it is much the better part of the dish!

Nationalism plays a certain part in the popularity of soups. Irish stew is a typical pottage, the recipe for which you can find in any medieval cookery book (minus the potato), but what is Scotch broth but Irish stew with the meat removed or chopped up small? Borsch (beetroot soup) is the national soup of Hungary and is, or was, served with thick sour cream. America has given us clam chowder, tomato, potato and oyster soups.

France produced bouillabaisse, the descendant of Nero's eel soup, and also the "pot-au-feu." Though we may have the greatest admiration for French cooking, this last is apt to seem a mess of stewed vegetables, watery and unappetising; it probably prompted that celebrated gourmet, the Marquis de Gussy, to say "Soup is like the preface to a good work; but a good work needs no preface!"

There remains only one little personal point. It is sometimes said that soups are of little value because they are largely composed of water. Discussing this with a medical friend recently I learnt to my dismay that I also am largely composed of water. I should hate to think I was of little value solely on that account.

The Compleat English COOK. 3

To make Onion Soup.

TAKE two Quarts of strong Veal Broth, fourteen large Onions, and cut them thin, and fry them tender; then burn half a quarter of a Pound of Butter black; and tosse up your fry'd Onions, and put in; then stew them half an Hour in your Broth, and take the Yolks of eight Eggs well beaten, fix Spoonfuls of *Spanish* Wine, and put them in a quarter of an Hour before you serve up, and keep stirring it till you send it away. Let your Bread be cut in Dice and fry'd.

To keep Soup always in readines.

TAKE two large Cocks or Capons, break their Bones, without spoiling their Flesh; eight Pounds of a Fillet of Beef, or Veal, a Marrow-bone, half a Calf's Foot, and put altogether in an Earthen Pot, with as much Water as you think will do; let it boil, and scum it clean; add to it as much Ginger as you can take up between your two Fingers

2 COURT COOKERY: Or,

To make Sallery Soup.

TAKE good Gravy and strong Broth, of each the like Quantity; take four Bunches of Sallery, ten Heads of Endive, and wash them, the Outside being taken off, cut them in Pieces about an Inch long. This Soup may be Brown or White; if Brown, put your Herbs into two Quarts of boiling Gravy, being first blanch'd in boiling Water, five or six Minutes; then take the Crust of two *French* Rolls, and boil them in three Pints of Gravy; strain it through a Strainer, and put it to the Herbs, (when they are near ready) with a Pullet in the Middle, and some Bread well soak'd in the Broth.

N.B. In all Soups you must not put in your Thickening till your Herbs are very tender.

Frank Richardson

(Leathercloth Division)

FIVE-FOOT-TALL Frank Richardson, 53-year-old chargehand in the Finishing Room at the Newton Works of Leathercloth Division, is the living embodiment of the old saw, "good things come in small parcels."

Born at Dukinfield, in Cheshire, a hundred yards from where he now lives, he started work by selling newspapers in the street of his home town when he was 10 years old, getting up at 5 a.m. to do so before going to school. Then, when 14, he was apprenticed to brass-finishing with a local firm. Because of his trade he was exempt from service during the first world war. Nevertheless, when of age he joined the Royal Welch Fusiliers and served with them until the end of the war. Frank, who was the smallest man in his company, still recalls how he once had to use his rifle as a ladder to clamber out of trenches that had been dug for much taller men.

After being demobilised young Richardson went back to finish his apprenticeship; but then during the post-war depression he was unemployed for three years from 1921 to 1924. He eventually found a job as a labourer with the engineering department of a cotton mill, and there he remained until joining I.C.I. on 30th September, 1930.

When Frank Richardson came to Rexine Works, Hyde, he started as a backhand in the finishing room. In his time there he reckons he has operated every machine in the room. In May 1949 he was appointed to Staff Grade and was selected for promotion to chargehand in December 1950. He is now responsible for seeing that five machines function correctly, for ensuring that the material they produce is made according to instructions and for passing the finished product.

He is a keen workman with a fine record. He has had wide experience as a Works Councillor and served both on the Division Council and the Central Works Council. He has also served on the Committee of Management of the I.C.I. (Workers) Friendly Society.

Frank has always had a wide range of activities outside his work. He has played most sports at one time or another and is now chairman of the Division Cricket Section. He is also a keen supporter of the Cheshire Boy Scouts Association, to which he has belonged for the last twelve years. In local theatricals he is a leading light and a member of the Ashton Repertory Company. For many years he was one of a concert party that appeared at charitable functions on Saturday nights. During the war a pantomime for which he was largely responsible raised £1600 for Red Cross prisoner of war funds.



I.C.I. NEWS

LORD McGOWAN DELIVERS DALTON LECTURE

The Right Honourable the Lord McGowan of Ardeer, K.B.E., Honorary President of Imperial Chemical Industries Ltd., delivered the Seventh Dalton Lecture, "A Hundred Years of Chemistry," on Thursday, 27th September, at the Town Hall, Manchester, in the presence of a distinguished audience which included the Most Worshipful the Lord Mayor of Manchester, Councillor W. Collingson, J.P.

The chairman on this occasion was H. W. Cremer Esq., C.B.E., president of the Royal Institute of Chemistry, supported by the chairman of the Manchester and District section, Dr. M. Barak. The demand for tickets greatly exceeded the available accommodation, and an audience of more than 800 filled the magnificent Great Hall.

Lord McGowan, with the president of the Institute and others, were received by the Lord Mayor in his private suite before the meeting.

The president of the Institute, introducing Lord McGowan, remarked on the origins of the Dalton Lecture, stressing the desire of the founder to perpetuate the name of the Manchester Quaker who did so much to place chemistry on a sound basis, and also to propound the beneficent impact of chemistry on contemporary life.

In his lecture Lord McGowan also dealt with the beneficent effects of modern chemistry on everyday life. Chemotherapy—the treatment of disease by means of chemical substances—had, he said, introduced a new and great era of medicine, and a substantial amount of the epoch-making work had been done by British chemists. He called attention to the major contributions to British chemical research in the last decade.

Among the medical discoveries he mentioned were the anti-bacterial properties of penicillin by Fleming and its development as an antibiotic by Florey and Chain; the sulpha drugs, thanks to which pneumonia was no longer "captain of the men of death" and puerperal fever was now becoming comparatively rare; the development of the sulphone group of drugs against leprosy; and 'Paludrine,' which gives complete immunity from malarial symptoms or blood infection.

The modern plastics industry, he said, was born in the

United States, but some of its greatest advances in the last two decades had been made in the United Kingdom. Polythene, for instance, a material of prodigious strength, with remarkable insulating powers and resistance to corrosion, was a British discovery. It first came into commercial production on the day the Nazis invaded Poland and, used as a high-frequency insulator, helped to put our radar systems streets ahead of the enemy's.

Lord McGowan said that the story of man-made fibres, another beneficent effect of chemistry on modern life, had scarcely begun. We had moved a long way since 1851 when cotton, wool, flax and silk were the circumscribing limits of textile production. New great viscose and acetate rayon industries have been built up, first in this country and then in every part of the world, and man-made fibres at prices which all can afford are bringing about a social revolution. There were great possibilities, too, in the recent developments in protein fibres, of which 'Ardil' was an example, and of synthetic fibres like 'Terylene,' the polyester fibre discovered in 1939 by Whinfield and Dickson at Accrington.

Lord McGowan also referred to the part chemical science is now playing in increasing the fertility of the soil and the need, in view of the world's rapidly increasing population,

for the farmer to use the new weapons and techniques, provided by the chemist, to grow more food.

Lord McGowan was a guest at the Dalton dinner, held in the Midland Hotel, after the lecture. Dr. A. Fleck and Mr. A. J. Quig, deputy chairmen of I.C.I., Dr. C. J. T. Cronshaw, Personnel and Group (B) Director, and Mr. P. K. Standing, chairman of Dyestuffs Division, were also present.

The lecture was supported by a two-day exhibition, "The Progress of Chemistry," held in the Town Hall extensions. A number of nationally known organisations combined to provide a unique display, which included a stand prepared jointly by Dyestuffs and Leathercloth Divisions and Imperial Chemical (Pharmaceuticals) Ltd.

The Dyestuffs Division exhibit showed the development of



The Lord Mayor of Manchester (Councillor W. Collingson, J.P.) with a representative of I.C.I. (P) Ltd. at the Progress of Chemistry Exhibition

(Photo: Kemsley Studios, Manchester)

the industry over ninety years, from the discovery of Mauveine in 1856 by William Henry Perkin—later, Sir William—to modern I.C.I. printing dyestuffs and its growth from a small factory at Greenford Green to the vast new factories of Dyestuffs Division which employ nearly 15,000 people. Leathercloth Division showed 'Rexine' and 'Vynide' fabrics for upholstery, travel goods, panelling, bookbinding and other purposes, and Imperial Chemical (Pharmaceuticals) Ltd. exhibited some of their wide range of products, including many unique chemotherapeutic agents used extensively in human and animal medicine.

The exhibition held so much interest for the Lord Mayor that his official visit extended over three hours. Other distinguished callers included the president of the Institute, the honorary treasurer, Dr. D. W. Kent-Jones, and Mr. P. K. Standing, chairman of the Dyestuffs Division.

A Successor to "Enterprise"

An enthusiastic reception to the new coloured cartoon film made by the Company to illustrate the accounts for 1950 was given at a recent preview by two eminent film critics—Mr. Carter, editor of *Cinematographic Weekly*, and Mr. Paul Dehn the noted film critic of the *Sunday Chronicle*. Both critics gave the film high praise for its imaginative presentation, for its beautiful cartoons and for the crisp, witty commentary.

Shorter than the previous cartoon film *Enterprise* and more restricted in its field, the new film, which is called *Balance*, has been made by the same team, notably Roger Macdougall, the author of some elegant rhyming couplets, and Peter Sachs the artist. The film illustrates with considerable ingenuity and humour where the money came from and where it went in 1950. It is a tribute to the inventive faculties of the artists concerned that a subject which might well be thought dry as dust and almost the last to lend itself to the medium of the film becomes in their hands a story of surprise and excitement.

Balance, or the story of the accounts for 1950, will very shortly go into circulation in the winter programme of the I.C.I. Travelling Film Unit. It is a film that is well worth seeing.

Book of the month

Both Sides of the Road, the book about farming by Mr. Sidney Rogerson, Publicity Controller of I.C.I., has been chosen as the November–December book of the month by the Country Book Club. *Both Sides of the Road*, which was illustrated by Charles Tunncliffe, was reviewed by Dr. Alexander Fleck in the February 1950 number of the *Magazine*. It was published by Collins and costs 21s.

ALKALI DIVISION

Mr. John Thompson, B.E.M.

In the recent Honours List it was announced that His Majesty the King had been graciously pleased to award the British Empire Medal to Mr. John Thompson of our Lostock Works in recognition of his services to the chemical industry. A ceremony took place at the Lostock Social Club on the morning of Tuesday, 25th September, when Viscount Leverhulme, the Lord Lieutenant of the County of Chester, presented the medal to Mr. Thompson before an audience composed of Division directors, representatives of the Lostock management, Mr. Thompson's family and old workmates, and members and officials of the Northwich Urban District Council.



I.C.I. MAGAZINE

The circulation of the *Magazine* shows a steady increase. For the October 1951 issue the *Magazine* worked for the first time to a print order of 60,000 copies per month. The figures for the last three years are:

October 1949	·	43,000
October 1950	·	57,000
October 1951	·	60,000

Of this increase, free copies to pensioners and national service men total approximately 8400 a month. This figure a year ago was 7000.

The Division chairman, Mr. W. M. Inman, welcoming Lord Leverhulme, pointed out that it was not possible for all awards to be presented personally to the recipient; this was therefore a special occasion, and Lord Leverhulme (as Lord Lieutenant) was acting as His Majesty's personal representative.

Before presenting the medal to Mr. Thompson, Lord Leverhulme spoke of his fifty years of service, the last fourteen as chargehand fitter, at Lostock. Mr. Thompson's qualities, he said, were well known to everybody. The official citation was then read:

"In his many years of service he has always been a most cheerful and willing worker. Whatever job he has been given he has taken it up with enthusiasm, and there have always been good reports from his managers. Despite his age and serious handicap of being almost completely deaf, he has done much by personal example to encourage his men to work hard. Finishing machine repairs have been the main limiting factors to the output of light ash at Lostock for many years, and high production has been maintained largely through Thompson's efforts in speeding up repairs."

Because of this very distinguished record of service, His Majesty the King had thought fit to award Mr. Thompson the British Empire Medal. The Lord Lieutenant felt that this would be an inspiration to all who worked at Lostock; it was an honour to I.C.I. and to Lostock Works. Lord Leverhulme emphasised his personal pleasure at taking part in the ceremony, especially as I.C.I. and the business with which he was associated had enjoyed such very long and cordial relations.

BILLINGHAM DIVISION

Board Appointments

With effect on and from 27th September Dr. G. I. Higson has been appointed chairman of the Billingham Division in succession to Mr. A. T. S. Zealley and Dr. R. Holroyd is appointed joint managing director.



Dr. Higson first came to Billingham in 1922 as a research chemist. He then became, successively, assistant research manager, deputy process manager and works manager and in 1931 was promoted to delegate director and Division manager of nitrogen process. He became technical director in 1936.

During the war Dr. Higson was in the U.S.A. and Canada for eighteen months in connection with a Government project. Since the war he has been a member of Government missions to Pakistan, East Africa and Egypt. He has been joint managing director of the Billingham Division since 1948.

Dr. Higson is a Doctor of Science, a Fellow of the Royal Institute of Chemistry, a Fellow of the Royal Photographic Society and is president of the Synthonia Photographic Section and vice-president of the Gardening Section.

Dr. Holroyd was first associated with I.C.I. at Winnington in 1928, having already been engaged for three years on coal-oil research, a subject on which he is a recognised authority. Closely associated with the development of the Billingham Oil Works throughout its history, Dr. Holroyd became research director in 1947.



A Fellow of the Institute of Petroleum and a corporate member of the Institute of Fuel, he has served three years on the Fuel Research Board of the Department of Industrial and Scientific Research.

DYESTUFFS DIVISION

Board Appointments

Mr. P. K. Standring, acting chairman of Dyestuffs Division since June this year, was appointed Division chairman on 13th September, 1951; on the same date Mr. C. Paine was appointed joint managing director.

Mr. Standring was born in Heywood, Lancashire, and was educated at Manchester Grammar School and Manchester University, where he graduated B.Sc. with honours in chemistry. After a year spent at the Ministry of Munitions he joined the Research Department at Levinstein Ltd. in July 1917. At the end of the year he was transferred to the Ellesmere Port factory, where for fifteen years his main concern was the manufacture of synthetic indigo. In 1931 he was made works manager

of Ellesmere Port and in 1937 works manager of the Blackley factory. Five years later he became group works manager. He was appointed a Division director in 1944 in addition to his post as production manager; a year later was promoted to joint managing director of the Division. Mr. Standring also joined the Plastics Division board in 1945. On 27th September he was appointed a member of the Wilton Council.



Mr. P. K. Standring

Mr. Paine, who has been research director of the Division since 1946, is a Yorkshireman by birth but completed his education at London University, where he graduated M.Sc. He also joined the Research Department at Levinstein Ltd. in 1917, where he worked as a research chemist for seventeen years. He specialised particularly in the dyestuffs and intermediates fields, in which he made a number of inventions, until 1934, when he was transferred to the Patents Department. In 1937 he was seconded to I.C.I. (New York), and after nearly two years in America he returned to Blackley and was appointed leader of the Exploratory Research Section. Mr. Paine became assistant research manager in 1942, research manager in 1943 and a director of I.C. (Pharmaceuticals) Ltd. the following year. Among his many outside interests Mr. Paine is chairman of the Wilmslow Guild, Cheshire, which is the largest adult education centre in Britain.



Mr. C. Paine

Miss M. H. Blacklock

At the end of June there resigned a member of the Dyestuffs Division who had spent practically the whole of her thirty-six years with the Company in London, and of whom it might be said that she grew up with the British dyestuffs industry.

Miss Marjorie Blacklock first worked for Mr. James Falconer, M.P., who had been a member of the committee set up by the Board of Trade to study the problems of dyestuffs supplies and who subsequently became the first chairman of British Dyes Ltd. when it was formed, in April 1915, from the old-established firm of Read, Holliday & Sons Ltd.

In July 1915 she joined the staff of British Dyes Ltd. when Mr. S. A. H. Whetmore opened the branch office in London. She worked there until 1927. The chairman, in order to devote most of his time to the business of the company, wished to be relieved, as far as possible, of affairs arising from his constituency and his other interests, and in this work Miss Blacklock played her part. In 1919 British Dyes Ltd. and Levinstein Ltd. were fused to form British Dyestuffs Corporation Ltd., and she was responsible for the administration of

the London office of the corporation and in this capacity came to know most of the people in that company. At all times there was work for the successive chairmen of the company.

In 1927 Miss Blacklock came to Nobel House to take charge of the Dyestuffs office, later moving into the new head offices at Imperial Chemical House, Millbank, returning to Nobel House when Imperial Chemical House was requisitioned in the early part of the war, and it was at Nobel House that she worked until her retirement. She developed a unique knowledge of dyestuffs matters as far as the Head Office organisation was concerned, and was responsible for handling large numbers of enquiries and also for the reception of visitors from both this country and overseas. In latter years Miss Blacklock also assisted in the preparation of reports for Dr. C. J. T. Cronshaw and carried out a considerable amount of liaison work on behalf of the Dyestuffs Division.

Mr. J. Baddiley

His many friends in I.C.I. will have learnt with deep regret of the death of Mr. J. Baddiley on 26th September.



Mr. Baddiley was born in Yorkshire in 1885 and joined Levinstein Ltd. at Blackley in 1909 from Leeds University, where he was a distinguished pupil of Professor Green. From being practically the only research chemist at Blackley he eventually became the head of a powerful research team; in 1944, when the Dyestuffs Group of I.C.I. was formed, he was appointed Research Director.

Mr. Baddiley played a great part in the rebirth of the British dyestuffs industry, which virtually took place in the early days of the first world war, and his wide knowledge and experience proved invaluable in the rebuilding and consolidation of the industry during the difficult years that followed. He devoted much of his life to research on dyestuffs, and at the time of his retirement in 1947 it was said: "There must be few men living today whose experience can in any way compare with Baddiley's—a fact which was recognised in 1939 by the Society of Dyers and Colourists when he was awarded the Perkin Medal."

GENERAL CHEMICALS DIVISION

Mr. A. S. Chamberlain

It is with very great regret that we announce the death of Mr. A. S. Chamberlain, which occurred on 25th September.

Mr. Chamberlain's association with the chemical industry began when he joined the firm of Electro Bleach and By-Products in 1913 to become its secretary. Six years later that company was acquired by Brunner, Mond & Co. and in due course became merged in I.C.I. And so it came about that soon after the formation of I.C.I. Mr. Chamberlain was transferred to the United Alkali Company as deputy accountant; when two years later the General Chemicals Group was set up he was appointed to be its chief accountant with, in 1939, a seat on the Group board. He continued in the position of chief accountant and finance director of the General Chemicals Division until ill health, which had pursued him

for several years, decided him reluctantly to retire from the Company's service in 1946, well in advance, unfortunately of the normal retiring age.

Mr. Chamberlain's term of office with General Chemicals Group (later Division) was a difficult one throughout almost its whole period. In the early days he had the care of all the complicated financial transactions connected with the winding up of the several separate companies merged in the Group, and when the war came he had the responsibility for the Division's part in the financial arrangements with the Treasury concerning the agency factories built and operated for the Ministry of Supply. The handling of all these problems called for certain qualities which Mr. Chamberlain had in full measure—a keen analytical mind, sound judgment based on long experience, and an ability to make quick and firm decisions. It was not only in the Divisions that these qualities of his were appreciated, for he was appointed to serve, as he did for many years, as a trustee of the Company's Staff, Foreign, and Foremen's Pension Funds.

He had many outside interests. Astronomy was his main study. He was a member of the Astronomical Association and a Fellow of the Royal Society of Arts. Watching cricket was another of his great pleasures, and he had been a member of the Surrey County Club since quite a young man. He was a lover of the theatre, and always he had his books.

LEATHERCLOTH DIVISION

Worker awarded the B.E.M.

Mr. Fred Lawson (Spreading Dept.) has been awarded the British Empire Medal for his action in helping to capture an armed man in Manchester on 26th January last.

The official account appearing in the Supplement to the *London Gazette* reads as follows:

"A man went into a tobacconist's shop in Manchester, pointed a revolver at the manageress and told her to hand over notes from the till. She grabbed a hammer and struck the floor several times to attract attention and then flung the hammer at the criminal. He ran into the street followed by the manageress, who called upon passers-by to stop him."

"Walter B. Hannah chased the man through crowded thoroughfares and caught and held him. The man pulled out a revolver and forced it against Hannah's stomach. Hannah pushed aside the revolver, and Robert Glass, a passer-by, went to his assistance. The man struggled and broke away, but Hannah and Glass followed and called out that the man was armed. Fred Lawson joined in the chase and jumped on the man from behind, and he and Glass overpowered him. The revolver, which was found to be loaded in six of the seven chambers, was thrown away by the man when he was caught."

"Glass, Hannah and Lawson, knowing the criminal to be armed, performed a brave and public-spirited action in chasing and capturing the man."

Mr. Lawson received the official intimation from the Prime Minister and also a letter of congratulation from the Home Secretary.



We should like to take this opportunity of adding our own congratulations to Mr. Lawson and to commend him on the action he took.

LIME DIVISION

Division Foreman Emigrates

Emigrating from the country on 4th November is Mr. A. M. Topham, who for just over three and a half years has been a foreman at Tunstead Kilns. Mr. Topham, who is married, is flying out to Tororo in Uganda, where he is to be production foreman on a battery of kilns and a hydrating plant which are being opened out. Thus his experience gained at Tunstead should prove very valuable, for the whole of his 15 years' service with the Company has been spent at that works. Starting as a labourer in July 1936, Mr. Topham gained rapid promotion, and, after a spell as plant attendant



at the Hydrating Plant, became a chargehand there in February 1940. He transferred to the Kilns Section on his promotion to foreman in December 1947 and has remained there ever since. A leading light in the formation of the Lime Division's Foreman's Association last year, he was its honorary secretary until his resignation on 26th October. Mr. Topham is confident, at 42, of making for himself a successful new career.

METALS DIVISION

Mr. Alfred Yardley Retires

A presentation ceremony marked the retirement on 31st August of Mr. Alfred Yardley of Elliott Works. Mr. Yardley joined the Company in 1915 and was later given control of the Wages Department at Selly Oak. Throughout his service Alfred Yardley was much respected for his trustworthiness in every matter with which he was concerned and for his un-failing kindness to all with whom he came into contact.



Mr. E. A. Bolton, factory manager, in expressing his thanks to Mr. Yardley for consistently good service, referred particularly to the time and trouble which he had devoted to running various Company schemes and special funds, and to his readiness at all times to give help and advice.

On behalf of friends and colleagues, Mr. H. M. Myers, production manager, presented Mr. Yardley with a radio set as a reminder of a long and very happy association.

The Teacher Taught

Early in September twenty-eight teachers from local schools visited Kynoch Works for the first Industrial Information

Course arranged by the Division Education and Training Department. The object of the experiment was to encourage closer co-operation between those concerned with industry and education, and to demonstrate the facilities offered to young recruits by the Metals Division.

The course included a brief description of the history and present status of the Division, talks dealing with the opportunities available to boys and girls entering the Company's service, a tour of the Research Department and several production and commercial departments, and a showing of the Metals Division film *Outing for Christopher*. The meeting ended with an "open forum" attended by representatives of the Staff, Labour, Engineering and Education and Training Departments, in the course of which many lively discussions took place.

A County Champion

Mr. W. Fisher, of C Bullet Department, Kynoch Works, has achieved, at the age of 58, the ambition of his life. Among 1200 competitors Mr. Fisher emerged champion of the 1951 Worcestershire and Warwickshire Merit Bowling competition.

As a county player Mr. Fisher had the great honour of representing the South of England in a Festival of Britain tournament at the Rolls-Royce Club, Derby. The South won convincingly, with Mr. Fisher contributing the best score of the match—a win of 21-8.

No doubt we shall be hearing more of this craftsman in recreation, who has time yet to add national and even international laurels to his county achievements.



NOBEL DIVISION

Presentations to Dr. J. W. McDavid, C.B.E.

"I am going to enjoy retirement just as I have enjoyed my working life. I regret leaving you all, but I know that with Dr. Jenkins the future of the Division is in good hands."

With that declaration Dr. McDavid ended his third speech in reply to three presentations and good wishes on the evening of 25th September. It had been a day of farewells to old friends for the retiring chairman of Nobel Division.

He was speaking to foremen from Nobel Division factories who had gathered in Ardeer Recreation Club to express their friendship and respect. Earlier that day, first in Africa House main dining room, then later in the Detonator Canteen, Ardeer Factory, Dr. McDavid had been honoured by representatives of Division staff and workers, united by a central thought and sentiment.

Mr. W. Thomson, Staff Manager, Nobel Division, presided at the staff presentation in Africa House and particularly welcomed Mrs. McDavid, who accompanied her husband. After paying personal tribute to Dr. McDavid he introduced Mr. S. Morrison of Ardeer, who presented a television set to the retiring chairman.

Immediately afterwards Dr. and Mrs. McDavid were the principals in a ceremony in the Detonator Canteen, Ardeer

Factory. Mr. Tom McCall, chairman of the workers' delegates to Nobel Division Council, occupied the chair and spoke for a representative gathering of workers in all departments of Ardeer and the English and Scottish factories.

It was, he said, a unique occasion, totally without precedent in the Division, in that so many people from all parts had gathered to pay tribute to Dr. McDavid.

As Dr. McDavid accepted a Georgian silver tea service and Mrs. McDavid a gold brooch there was great applause. The tea service is the work of the Edinburgh silversmith William Robertson and was fashioned in 1792, the accompanying sugar basin of the same date being the work of a London silversmith, Charles Allridge.

In his speech Dr. McDavid recollected some early days in Ardeer and paid tribute to the pioneers. He had been with the Company 39 years, which was precisely half the age of Ardeer Factory itself, and there had been great changes. Perhaps he would cherish most his recollections of people, as he had always been more interested in people than in things. During his term of service he had done what he could to improve working conditions and pay, and indeed over the 39 years there had been a vast change in the nature of employment in Division factories. Today he felt he was among old friends, men and women, not mere check numbers. Today management was realising that the most valuable materials in any factory were the men and women.

In the evening Dr. McDavid was for the third time that day entertained by Division foremen under the chairmanship of Mr. J. Cumming in Ardeer Recreation Club and presented with a silver salver.

Mr. L. Hall

The appointment of Mr. L. Hall as Finance Director on the Division board was announced in mid-September. Mr. Hall has been with the Company for 22 years and since 1943 he has been Chief Accountant.

He came to I.C.I. in 1929 to work in the Treasurer's Department, where in a short time his qualities were realised. He was soon transferred to work as assistant to Mr. A. W. Louttit, Chief Accountant of the Explosives Group. While filling that post he was also Chief Accountant for Curtis's and Harvey Ltd. When Mr. Louttit retired in 1943 Mr. Hall succeeded him as Chief Accountant for the Nobel Division (then known as the Explosives Division).

Westquarter Remembered

What was it like near the beginning? However frequently the question is asked it is rarely answered quite as comprehensively as in a letter recently received by Mr. A. P. Cattle, works manager, Westquarter. Reading of Westquarter's celebrations in the *Falkirk Herald*, Mr. William Sinclair, now retired at Fort William, Ontario, Canada, wrote in congratulation and told the people today what work in Westquarter was like in 1883. Then he was one of five or six boys working under his father. Each made twenty-four electric detonator fuses per day. "Detonators," writes Mr. Sinclair, "were at that time pressed by hand on a foot treadle machine, and each girl pressed 10,000 per day at 3d. per 1000."

Mr. Sinclair's letter is written in an excellent hand and is full of accurate recollection. He worked in Westquarter until 1904, when he went to Regent Factory, Linlithgow, as a foreman in safety fuse manufacture. Some years later he

emigrated to Canada, where he was foreman in the new E.D. Fuse Department at the Brownsburg factory of the Canadian Explosives Company (now Canadian Industries Ltd.) in the Province of Quebec. After completing a three years' contract he left explosives manufacture and settled in Fort William, Ontario, where he has lived ever since.

Mr. Cattle has written to Mr. Sinclair thanking him for his letter and adding to his recollections by telling of several old Westquarter employees whom he may remember and who are still alive.

PAINTS DIVISION

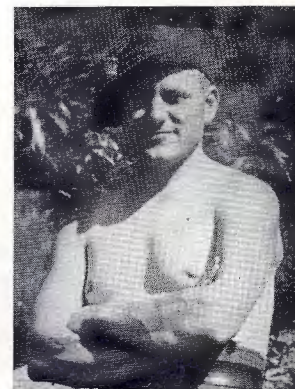
The Only Paints Man in Korea

Paints Division has for some months now been represented in Korea solely by Mr. A. E. ("Nobby") Hill, late of the Packing Department. Mr. Hill, however, who is, incidentally, with a tank squadron and not on the Company's business, was hoping to embark for home early in October and should now be well on his way to these shores.

Mr. Hill's first introduction to army life was in July 1940, when he was called up from the Packing Department, Slough, where he had been working for the previous five years.

In 1946 his turn for demobilisation came, and when he was handed his demob suit "Nobby," then a trooper in the Tank Corps, accepted it gratefully, thanked his lucky stars for his good fortune, and prepared to return to his peacetime job and home life.

However, his stay in the Packing Department this time was not long. The authorities obviously thought that he could teach the youngsters a thing or two, so in August 1950 back he had to go. Was he not one of those who landed in Normandy on D-Day and fought in the Falaise Gap? So who better to straighten things out in Korea? But now Mr. Hill's second whack should be almost over, and we hope that when he has had a suitable rest after an arduous campaign he will be back at his old job again.



Paints Products used 2000 ft. Underground

Trials carried out with Paints Division products at Glapwell Colliery, near Chesterfield, on 20th September may well result in an important improvement in mining safety. When reopening galleries sealed off after a fire or explosion it is necessary to erect a temporary brattice-cloth barrier to prevent the high concentration of methane (up to 75%) present in the sealed-off part from seeping into the normal circulating air to form an explosive mixture. Hitherto these temporary barriers had not been perfectly airtight, and the National Coal Board enlisted Paints Division's help in the development of a suitable material for bridging gaps and sealing off cavities present in the brattice-cloth barriers.

The most promising material seemed to be the spray-packaging or cocooning solutions which have been used since the war for the protection of naval equipment. These solutions, when sprayed, form a spider's web which bridges a gap

12 in. square. Over this web support several coats of 'Vinylite' lacquer may then be sprayed to provide a hermetic seal.

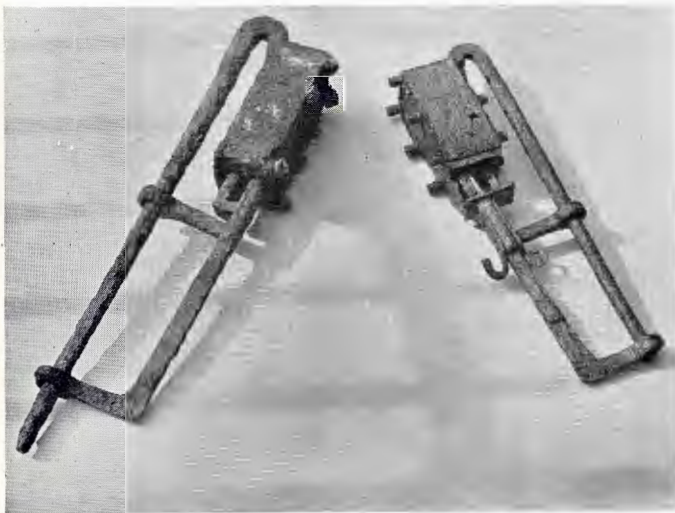
Two officials from the National Coal Board subsequently visited Stowmarket Factory to explore the practical possibilities of the suggested system. As a result, the trials at Glapwell Colliery were arranged. Paints Division representatives were Mr. J. N. T. Adcock (Division Technical Service manager) and Mr. J. Vincent (Technical Service Station), who conducted the spraying operations.

The results of these experiments were extremely satisfactory. Two sections, 620 yards below ground, were tackled by the method suggested by Paints Division, with very promising results.

Working conditions during the experiments were hardly ideal: all the surfaces were coated liberally with shale, coal dust and limestone grit, and a powerful draught blew through all the crannies. But in spite of these difficulties excellent results were achieved, auguring well for further experiments contemplated in the near future.

'Deoxidine' cleans up History

Relics of Roman Britain, of immense importance to the historian and the archaeologist, are often so covered with rust when dug up after being buried for nearly 2000 years that their original shape and use are obscured. Now a Paints Division product is being used to remove the accumulation of many centuries' rust from museum treasures and bring back to their original shape implements with which our forbears fought and dug the ground and which were useful and decorative in their homes.



Excavated Roman locks before and after treatment with 'Deoxidine'

During the early centuries of the Christian era the people in Roman Britain could hardly have foreseen that hundreds of years later their iron swords, cartwheels, scythes and other equipment which they left behind in plenty for future generations to find would present something of a problem to the curators of many museums up and down the country, including the curator of the Cambridge University Museum of Archaeology and Ethnology.

At this museum one of the curator's problems has been the preservation and cleaning of the well-known hoard of fourth-

and fifth-century Roman ironwork, found at Great Chesterford, Essex, in 1856 and purchased by the museum from Lord Braybrooke in 1948. Most of the objects in this hoard were covered deeply in rust, which threatened to destroy the objects and to obscure details important to the archaeologist.



Roman chariot tyres being brushed in a bath of 'Deoxidine'

As far back as 1933 Dr. H. J. Plenderleith, of the British Museum Laboratory, in his book, *The Preservation of Antiquities*, had recommended the use of 'Deoxidine' for the removal of rust from ancient objects. Following his recommendation, the Cambridge University Museum of Archaeology and Ethnology have treated many iron objects, both from the Braybrooke Collection and from other sources, with 'Deoxidine' obtained from I.C.I. Paints Division. All the rust was effectively removed and much interesting detail revealed.

PLASTICS DIVISION

Board Appointments

Mr. J. C. Swallow has been appointed chairman of I.C.I. Plastics Division in succession to Mr. P. C. Allen, who becomes a member of the I.C.I. Board and Group Director responsible for the Plastics, Paints and Leathercloth Divisions. The new chairman was formerly joint managing director. Before coming to the Plastics Division in 1942 as Research Director, Mr. Swallow was Research Manager of I.C.I.'s Alkali Division, where the research work leading to the discovery and manufacture of polythene was carried out. He has been associated with I.C.I. since its formation and throughout his scientific career has taken a very active part in plastics research. This year Mr. Swallow delivered a series of Cantor Lectures to the Royal Society of Arts entitled "The Plastics Industry."

Dr. J. E. Sisson has been appointed joint managing director



of I.C.I. Plastics Division. Dr. Sisson became the delegate director responsible for sales in May 1949. Prior to that he was sales manager in the Plastics Department of I.C.I.'s Southern Region Sales Office for two years.

Dr. Sisson joined I.C.I. in 1933 as Technical Officer at Billingham, subsequently becoming works manager at the 'Mouldrite' factory at Croydon, and in May 1943 manager of Home Sales Control Department, Welwyn Garden City.

THE REGIONS

Mr. E. J. C. Parker

Mr. E. J. C. Parker succeeded Mr. W. D. Scott as Southern Regional manager on 1st October. He is well known at Southern Region and will be greeted as an old friend who has not long been absent.

Mr. Parker joined the British Dyestuffs Corporation in 1927 and the London office of the South Eastern Division in 1928. In 1946 he was appointed deputy Regional manager of the Southern Region, only to leave again last year on his appointment as Regional manager of the Mildand Region.

W. H. ("Pop") Clements

After 52 years' service with the Company, albeit not absolutely continuous, Mr. W. H. Clements, known familiarly as "Pop," has been forced into retirement by ill health.



Mr. Clements joined Curtis's and Harvey Ltd., in 1899. This firm specialised in the manufacture of small arms powders at Hounslow. At that time material from the factory was shipped in wagons to Isleworth and there loaded into barges destined for ships lying at Gravesend or Faversham. Pop joined the fleet of barges as a mate and at the end of his apprenticeship became a free-man of the river Thames.

In 1902 he joined the Royal Engineers for seven years with the colours. In 1909 he was back again, this time as assistant magazine-keeper at Erith, later to be promoted to magazine-keeper, but 1914 saw him in the army once again, serving with great distinction in the 15th Scottish Division, winning the Military Medal and being twice mentioned in despatches.

In 1918 Curtis's and Harvey merged with Nobel Explosives Company to become Explosives Trades Ltd. and later Nobel Industries Ltd., and in the rationalisation of manufacture which followed the Faversham factory which made cordite was closed in 1919 and with it the Erith magazine.

However, Pop could not be kept out of the Company, and in about 1921 he rejoined what was to become Nobel Chemical Finishes Ltd. He served as a commissionaire and in 1939 moved to Mill Hill in the general evacuation. During the war he devoted what time he could to A.R.P. duties. When the Southern Regional Office returned to Gloucester House Pop came with them, and until his retirement he was an active and invaluable member of establishment.

In 1949 he was presented with a gold watch in recognition of his long service with the Company.

CENTRAL AGRICULTURAL CONTROL

Mr. S. W. Cheveley, O.B.E., appointed Chairman

Mr. S. W. Cheveley, managing director of Plant Protection Ltd. since 1944, has been appointed chairman of the Central Agricultural Control of Imperial Chemical Industries Ltd. with effect from 1st January, 1952, when Mr. F. C. O. Speyer, C.B.E., the present Central Agricultural Control chairman, retires.



Mr. Cheveley was born in Yorkshire in 1900 and his early farming experience was in the East Riding, Cumberland and South Wales. Following the 1914-18 war, in which he served in the H.A.C., he graduated M.Sc. (Agriculture) at Leeds University and held a

Ministry of Agriculture scholarship for research in farm economics under Dr. H. G. Ruston. He was appointed to the field staff of the British Sulphate of Ammonia Federation and transferred to I.C.I. in 1926. In mid-September he left on a tour which is to include India, Australia and New Zealand. At his home near Tunbridge Wells Mr. Cheveley farms 250 acres and breeds Guernsey cattle and Hampshire sheep.

Mr. T. Ainslie Robertson, chairman of Plant Protection, writes:

"Mr. Cheveley has been a director of Plant Protection Ltd. since 1941 and managing director since 1944, and during that time he has given the Company service of inestimable value. I refer not only to the value of his work in the organisation of Plant Protection as a company of national and international importance. However impressive that record is, his colleagues will, at this moment, dwell rather on Mr. Cheveley's human qualities, which have contributed so much to the family spirit which runs throughout our Company.

"It is indeed a compliment to Plant Protection that I.C.I. have selected its managing director for such an important post, and he will carry with him the congratulations as well as the good wishes of all his colleagues."

THE DECEMBER MAGAZINE

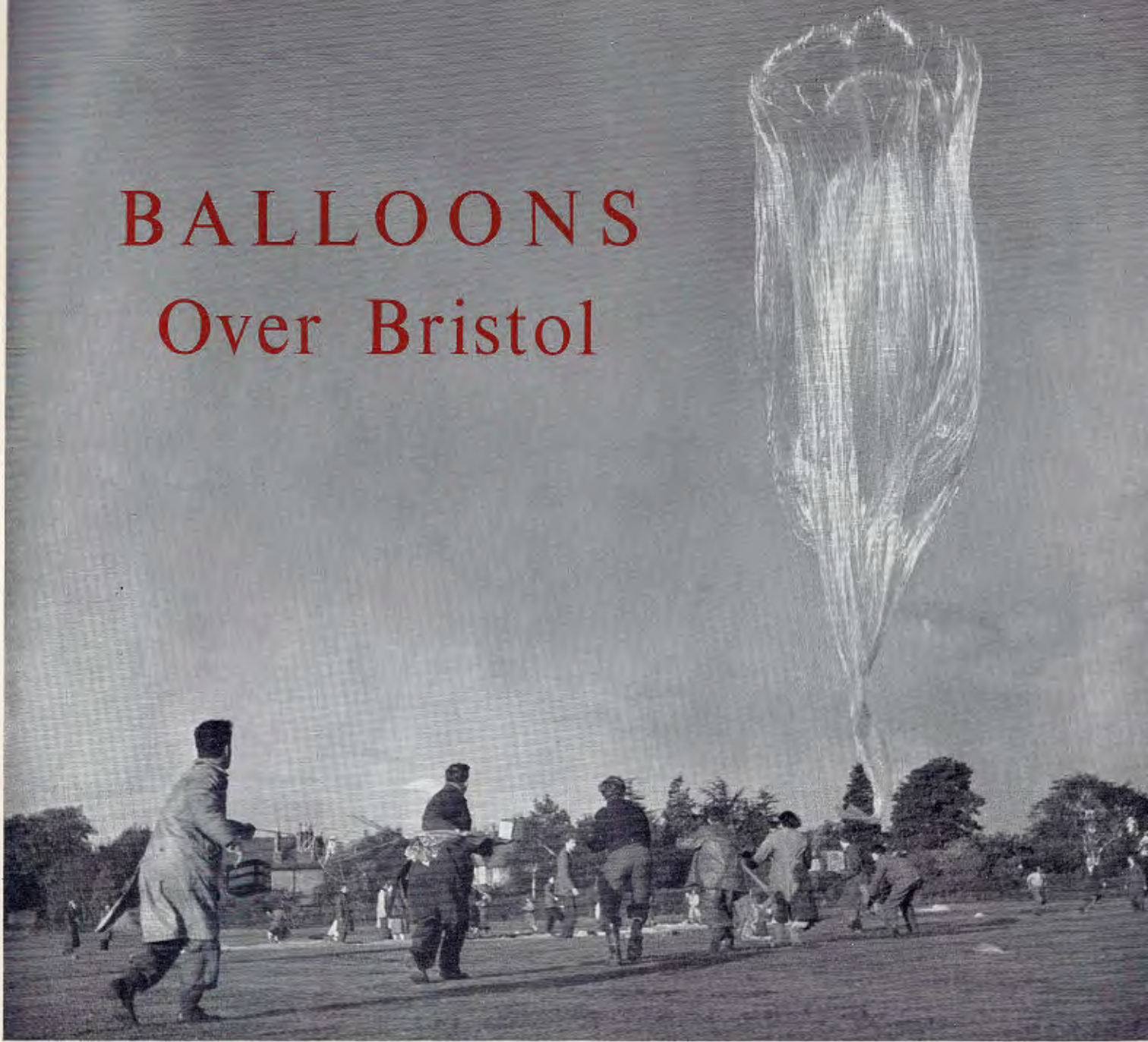
December 7th is the twenty-fifth birthday of the Company, and to commemorate this we open with an authoritative article giving the story of the negotiations leading to the formation of the Company in 1926. Today the vision of the men who made the merger—Sir Harry McGowan and Sir Alfred Mond, as they then were—stands vindicated in the flourishing organisation we all know. The illustrations are contemporary photographs.

Next, Mr. J. N. Hickson of Salt Division contributes a learned but none the less fascinating account of the customs and uses attached to salt, from Biblical times to the present day. Some beautiful photographs show how salt has inspired the silversmith and the goldsmith in some of their finest work.

Two articles in lighter vein follow. A young member of Paints Division tells of *his* answer to the housing shortage—to build your own caravan; and Gordon Long, whose humorous articles for the *Magazine* are widely popular, writes on practical jokes he has known.

BALLOONS

Over Bristol



By Gordon Begg (I.C.I. Film Unit)

THE research into cosmic rays which is being carried out at Bristol University is of particular interest to I.C.I. It is not only the fact that Professor Cecil Powell, who is in charge of the research team, is a Nobel Prize winner, nor yet that atomic physics is inevitably a subject of great importance to our Company. There is another, possibly a more parochial reason, for us to follow the exploits of Professor Powell's team.

Part of the research consists of sending photographic plates up into the stratosphere. The fact that these plates must remain for some hours at a constant height precludes the use of rockets of the V2 type. The best alternative to this lies

in the use of balloons. And it is certain that the best material known to us at present for making this particular type of balloon is I.C.I.'s tough light plastic, polythene. The words versatile and ubiquitous are favoured by publicity men, but they may be justifiably applied to a material which is used for packaging turkeys and Bentleys, which has been used to carry fresh water under the ground and far below the sea, and which has now witnessed phenomena which men find hard even to imagine, eighteen miles above the earth.

What do they look like, these polythene balloons? The first fact to grasp is their size. I went to Bristol not expecting to see a child's toy balloon; the one I had imagined was perhaps as



MAKING THE BALLOON. *Dr. Heitler, designer of the balloon, and a team of helpers are here engaged on the final stage of assembly.*

big as a car, a super edition of the R.A.F. meteorological balloon. I was well out.

The last two flights have been made with 100 ft. balloons, and a 200 ft. one is being prepared for flight in the near future. A considerable amount of polythene film, therefore, is needed to make these giants. Doctor Heitler, Professor Powell's assistant, showed me the long gallery high up near the roof of the Royal Fort at Bristol where the balloons are made. I found it impressive. The balloon is made up of a considerable



HALF AN HOUR TO GO. *watched by students of Bristol University, the envelope is beginning to swell as hydrogen enters.*

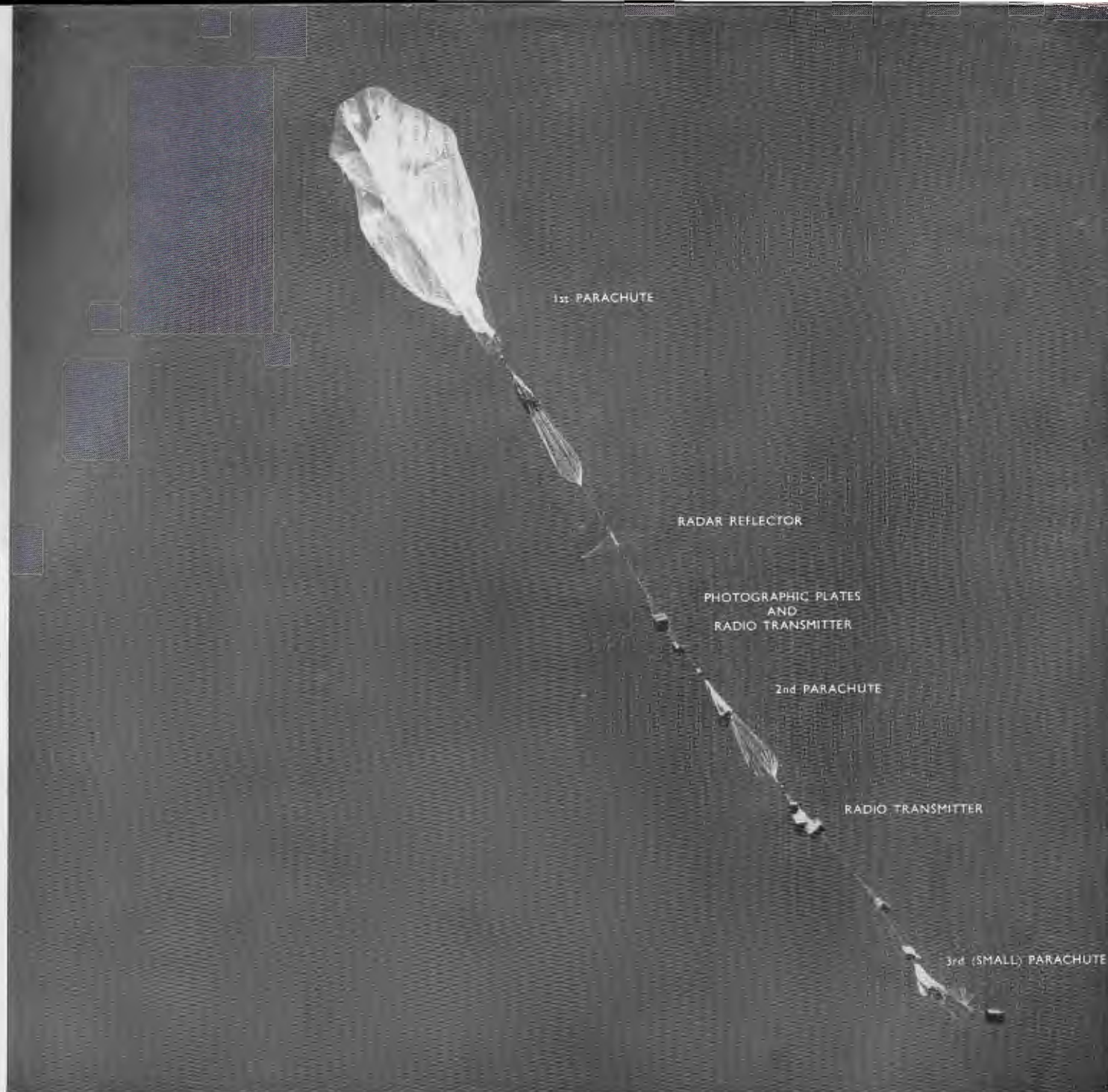
number of long thin strips of film. Each strip must be welded to its neighbour. For small jobs polythene film is welded with an electric iron on any hard surface. A strip of fluon is used to prevent the iron sticking to the film. Because of the enormous length to be handled the Bristol team has evolved a hundred-foot table with a narrow raised platform on it. The two strips of film are laid on the table with their edges overlapping on the raised platform. The iron used is in the form of a roller. This is hand operated in one slow continuous walk up the table. A loop of fluon is continuously fed between roller and film. This work is slow, because it must be well done. Some months, then, pass between the welding of the first two panels and the completion of the balloon. A new sealing technique, in which a blast of air replaces the roller, is being tried; this will reduce the time of making the balloon to less than three weeks. Other students in the meantime will have been preparing the balloon's load—the photographic plates which will record the atomic tracks, the parachutes which will bring these plates down to earth, the mechanisms for releasing the parachutes, and finally radio transmitters which will give signals indicating the balloon's altitude.

When all these preparations are made comes the time of frustration. It is useless to send these balloons up unless weather conditions are perfect, that is unless there is the minimum wind on the ground and in the upper air. Often weeks pass by at this stage. The balloon lies folded in a cricket pavilion, the cylinders of hydrogen stacked nearby. The components of the balloon's load must be checked and rechecked for signs of deterioration, and the Professor or his assistant must be on permanent stand-by lest they should be taken by surprise by a sudden good weather report.

When the great day dawns—and dawn is the operative word—the drama quickly unfolds. By the grey hour of 5 a.m. the cricket field is alive with figures, bustling but purposeful. The balloon is unfolded and laid out, its head against the wind. Behind it, like the tail of a child's kite, lies the string of the parachutes and their loads. Slowly hydrogen enters the envelope, hissing through the filling tubes. The alarm clocks which control the parachute's release mechanism are set. The drowsy motion of the balloon lifting its head contrasts with the now feverish activity around it. All round the gradually swelling balloon, students hold ropes to keep it down. Along the whole length of the tail more students stand by each of the load's components, for the take-off of these delicate instruments and fragile plates must be assisted to avoid their dragging along the ground. By now the balloon is 7% filled with hydrogen. This is its full quota, for, as the balloon climbs, the gas expands to fill the envelope. The last hydrogen cylinder is disconnected; Professor Powell judges the moment.

Then suddenly, silently the balloon is rising into the lightening sky. The men manning the parachutes and loads run with demoniac energy until their precious loads are tugged from their hands. Theirs is a furious, headlong, almost Gadarene charge. Two of them trip and fall, but not before the take-off is complete. The silence is jarred by a ragged cheer as up, up swiftly, above the trees and roofs of a Bristol suburb, floats the balloon. At this stage its shape looks like a big parachute. Later, as fifty pairs of eyes follow its vertical flight, it appears rounder; and as the first glimpse of sun touches it with silver it looks glamorous and mysterious.

We, on the ground, can well understand how both here and in the United States apprehensive folk on land and in planes reported the existence of flying saucers. But instead of



TAKE OFF AT DAWN. *Professor Powell and his assistants see the reward of months of work and waiting as the balloon carries its precious load of instruments rapidly upwards to the stratosphere.*

another world watching us it is we who are watching another world. It is in the stratosphere eighteen miles above the West Country that the great remote eye of Bristol University is noting, recording and sending down to us the activities of mesons and electrons and all the denizens of the stratosphere, whose names to the layman smack of the fantasy of H. G. Wells and Superman.

When the balloon is finally out of sight, all touch is not lost with it. It will be recalled that part of the "kite tail" included radio transmitters. These give out signals, differing in pitch as they gain altitude. Up in the Royal Fort students man the radio receiving set and keep track of the climb. To the cameraman and journalists and B.B.C. commentators the story is over. But to the research team it has only just begun.

It is in the darkrooms and laboratories of the University Physics Department a few weeks after the flight that the plates will be developed and the atomic tracks studied and the data derived from them noted and compared with those of previous ascents. The research will continue, and further ascents will be prepared long after the people in Towcester or Toulouse or Tilburg have forgotten their excitement at finding the packages from the sky.

As for the balloon, no one can tell where its final resting place will be. Free of its parachutes, its job done, it may drift for weeks before coming down, battered beyond recognition, in some remote part of the world. Knowing polythene, it is a safe bet that even then it will end up as wrapping for an Eskimo's sandwiches or keeping the rain off a gondolier.



Pas-de-Deux Valse ("Les Sylphides")

Photo by G. Parker (Metals Division, Witton)